SURGICAL ENQUIRIES;

INCLUDING

THE HASTINGS ESSAY ON SHOCK,

THE TREATMENT OF SURGICAL INFLAMMATIONS,

AND

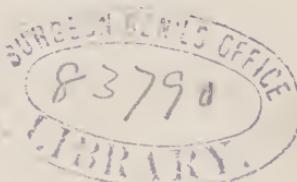### NUMEROUS CLINICAL LECTURES.

SECOND EDITION.

BY

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PREFACE.

In the preface to the first edition of this work I said it was a Collection of Notes which I hoped to be able to make more complete at another time. In this edition, while still aiming at brevity, I have spoken more at length. The Hastings Essay on Shock has been revised and included in these pages. Here, too, are reproduced, after an examination in the light of additional experience, certain views on the treatment of the inflammations which specially fall under the care of the surgeon. I have also added various Clinical Lectures and Notes on subjects in which I have taken special interest, or which I have had unusual opportunities of investigating.

Many friends and correspondents, not a few of them far away from large collections of books, transactions, and serials, ask me where they can find a description of some operation, or some method of treatment which I have from time to time, and with unavoidable condensation, brought under their notice. If it served no other purpose than that of meeting *their* wants I should look upon the labour given to the publication of this volume as sufficiently rewarded. If others should find in its pages any helpful suggestion my reward will be the greater.

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PART I.

ENQUIRIES IN SURGERY GENERALLY.

ON SHOCK AFTER SURGICAL OPERATIONS AND INJURIES.

(THE HASTINGS ESSAY.)

SHOCK may be defined in general terms as a peculiar condition of the animal system, characterised by depression of all its functions, the result of a powerful impression applied to the nervous centres, or to a portion, more or less considerable, of the peripheral nervous expansion.

After the several operations of the nervous system, and the agency of external forces in relation thereto, have been referred to, as well as the question of the interchange or correlation of the forces generally, vital and physical, it will be desirable to attempt a more specific definition of the condition resulting from the effects of injuries or operations, known as shock.

The primary effect of any impression which gives rise to shock is exerted in the great majority of cases, but not in all, directly on the nervous centres; the same impression, however, acts secondarily on all the organs and structures of the animal organisation. Such impression acts partly through the agency of the nervous apparatus, which is brought into close relationship with every part of the animal economy; but another and important, perhaps the most important, manner in which the effects of shock are made manifest, is through the impaired power of the heart and circulation

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which is induced by the state of the nervous system. The manifestations of vitality in the body generally are largely dependent on the circulation of arterial blood—all are diminished in a degree proportionate to the lowered action of the heart. Every cause, the operation of which gives rise to shock, whether through the intervention of the nervous system or not, acts upon the central organ of circulation and diminishes its force. With unimpaired cardiac action, shock is impossible. It will be seen later that, in a few exceptional cases, shock may be traced to the operation of agents which act solely on the muscular fibre of the heart, and which have no direct influence on the nerves.

It is impossible to approach the question of shock, or pursue its investigation with any advantage, except in the light of our modern knowledge of the structure and functions of the cerebro-spinal and ganglionic nervous systems. It would be out of place, and indeed impossible, to do more here than glance at such facts as more especially appertain to the question of shock. It is characteristic of the vertebrata, that, of all the component parts of the organisation, the nervous system is the loftiest in its functions, and the most complicated and elaborate in its construction. While in the invertebrata the nervous system is subservient to the other organs and structures, every organ and every structure in the vertebrata is subservient to the nervous system. The nervous system is essentially the animal; all else in the individual is destined to contribute to its support, or to carry out its behests. The cerebro-spinal system is the instrument by means of which the will, the intellect, the sensibilities, the sensations, and all the varied modes of action, are brought into operation, and their effects made manifest. With the cerebro-spinal system, the ganglionic nervous apparatus has intimate relations; and impressions made on the one are communicated to the other, so far as is compatible with the more active manifestation of nerve-force in the one and the more torpid action in the other.

As shock shows itself particularly in the absence of muscular action, it will be well to notice briefly the several

modes in which action is called forth by the nervous-centres, because without such information it is impossible to form an accurate conception of the nature, and still less of the degree of intensity of the existing shock. Our knowledge of the physiology of the nervous system has, of late, been greatly enlarged by the labours of observers and thinkers whose researches possess the highest value. Well known and widely recognised as such knowledge is, it is a matter for regret that no attempt has been made to apply it to an explanation of the nature and phenomena of shock. One writer (Mr. Savory), in a short and interesting essay, has certainly evinced a desire, so far as his limits allowed, to lift the subject to a higher level. The actions of the muscular organisation may be divided into two classes—those which take place through the instrumentality of the spinal cord and its upward prolongation, the medulla oblongata, and those which are the direct manifestations of the psychical power. The first set of actions comprise the excito-motor or reflex, as well as the sensori-motor or consensual; while those of the higher seats of origin of nerve-power are, briefly expressed, those educed by the feelings, ideas, and the will—namely, the emotional, the ideational, and the volitional. We shall find that in shock the most exalted of these, those which lend most dignity to human life, are the first to be impaired or suspended. In the arrested manifestation of these, there is comparatively little danger to the continued performance of the functions essential to life. Not so is it as we descend in the scale of nervo-muscular action. When sensori-motor action is arrested, life itself is in danger; and when excito-motor action in some of its manifestations (the suspension of all excito-motor action, it is needless to say, is inconsistent with life) is impaired, a fatal termination is extremely probable. A single but striking illustration may be given. The nerves which govern the act of deglutition arise from nuclei which are seated in the medulla oblongata (which, not only as regards excito-motor and sensori-motor action, but anatomically also, should be strictly considered as a portion of the spinal cord—so that, as Dr. Carpenter and

other physiologists point out, many nerves commonly described as cranial are really spinal), and very near the vesicular nuclei which give origin to the nerves of respiration. Now, if the power of deglutition be completely lost, in a case of shock, there is strong ground for apprehension that respiration itself will quickly cease. With suspended respiration comes suspended circulation, and death—somatic death, at least—ensues.

It may be fairly urged, that the time has now arrived for the surgeon to call into his aid, and to utilise, a branch of scientific investigation which, of late years, has acquired an importance so great that it threatens to seriously modify the whole subject of physiology. If this is so, and if, as no one doubts, pathology is merely disturbed or diseased physiology, it is scarcely necessary to do more than point to the bearings which such new views must have on our interpretation of pathological actions and conditions. The principles of the correlation and convertibility of forces have been brought before us so admirably by Mr. Grove, Professor Tyndall, and Dr. Carpenter, that we can no longer hesitate to ask in what manner, and to what extent, we must investigate the whole range of pathology under the new light which they furnish.

It appears (and the bearing on shock of this statement is significant) that of all the vital forces—developmental, organising, secreting, nutritive and others—nerve-force is the most strikingly correlated to the physical forces. As we might anticipate, from the constructive and psychical supremacy of the nervous system, nerve-force is that which controls, influences, or modifies all others. Elevated, and justly so, as is our idea of the character of nerve-force, because of its manifestation in the mental powers, we must not forget that the origin of nerve-force (the forces of which nerve-force is a metamorphosis) is from the forces residing in the materials of the external world. Just as in animal life all the materials of development and maintenance are drawn from the inorganic world, and at death are given back to it finally and completely, so the several forces which are manifested in the animal

organism are also derived from the forces of the inorganic world, and are also given back finally in the form of the chemical forces which are evolved in the decomposition of the body after death. Both the matter and the forces pass through new shapes and new manifestations, but neither admit of increase, or diminution, or destruction.

The effects of shock in antagonising or changing nerve-force will be considered later; yet some introductory reference to the important bearings of the subject has been deemed useful at this point. A given amount of nerve or of any other force is interchangeable with (in shock we may perhaps say replaced by) some other force, but the quantities of the forces are always equivalent, and the second force is capable of being again converted into the first without loss and without addition. The operation and the interchange of force are invariably effected through the medium of a material substratum. Certain forces admit of conversion through the instrumentality of any kind of matter; others require for the same purpose special substances. The highly complicated structure, nerve-substance (nerve-force arising in the vesicular matter and being transmitted along the tubular), is the material substratum or medium, by means of which the operations of nerve-force are made known, and by means of which also nerve-force may be interchanged or converted. It is not surprising, therefore, in accordance with the requirements of the animal well-being, that it is characteristic of the structure of nervous tissue that every precaution is taken for the isolation, the preservation, and the non-convertibility of that force, the exercise of which is its special attribute. Under powerful influences, however, as we shall see, nerve-force is capable of interchange—with what forces and in what manner is a question of extreme obscurity, to which reference will again be made. The fact of the convertibility of nerve-force itself is, however, beyond all doubt. The experiments and researches of physiologists have led them to the opinion which is thus expressed by Dr. Carpenter: the correlation of electricity and magnetism is "not more complete than the correlation of electricity and nerve-force may be shown to be."

It is desirable now to pass to a brief consideration of the anatomical and physiological bearings of those cases of shock which do not arise from a primary and violent impression on the nervous system. It is assumed, in surgical writings, that the phenomena of shock are invariably produced through the agency of the nervous system, directly or indirectly, as in its influence on the circulatory system. This statement is no doubt true in the great majority of cases, but it is not absolutely true. Certain poisons (and poisons admittedly rank among the causes of shock), such as the upas poison and the cyanide of potassium, if injected into the blood, act directly on the muscular fibre of the heart, and impairing its power of contractility, give rise to those numerous secondary effects of shock which depend on an imperfect, or arrested, supply of arterial blood. In the operation of such poisons, the nervous system is not implicated. The motor filaments are capable of conveying the exciting stimulus; but the muscular fibres, to which they are distributed, are unable to answer to the wonted call. This class of poisons is the exact opposite of that class which, as in the case of the woorara poison, acts on the nerves only —the action being first on the filaments of distribution, and then on the larger trunks.

It is a question of great interest, whether shock would follow as the effect of injuries (say compound fracture or amputation of the thigh) on a part cut off from all communication with the cerebro-spinal system, as in complete hemiplegia or paraplegia. I am not aware that any recorded cases illustrate this point. Could a sufficiently powerful influence be exerted on the cerebro-spinal system through the medium of the ganglionic system to produce shock? That the sympathetic system is capable of being greatly influenced by direct injury, is supposed to be conclusively shown by the effect of a blow on the epigastrium when the stomach is distended. Every author who repeats this view, appears to me to have forgotten that the terminal distribution of the pneumogastric nerves is in the stomach. The effects of blows on the stomach may, I think, be more correctly referred to the impression made on the pneumo-

gastric nerves. Several reasons may be urged in favour of this explanation.

1. The sympathetic is intrinsically a sluggish system, and seems to have little susceptibility and little motor power, save that which relates to the organic and vaso-motor functions.

2. The vagus is also distributed to the heart; and, according to Von Bezold and others, it has for its function that most peculiar and exceptional one, of retarding the muscular contractility of the heart. The inhibitory influence of the pneumogastric is peculiar, because most nerves stimulate to action the muscles which they supply.

3. Weber's experiments, repeated by others, proved that interrupted galvanic currents suspended the heart's action.

4. Galvanism (or shock) to the sympathetic increased the heart's action.

It is not denied that a powerful impression on the sympathetic system may give rise to shock, but probably not so readily as is generally supposed. At my request, a most able physiologist, Dr. Norris, performed, with great care, the following experiment. I give it in his own words.

" Having etherised a strong frog to a moderate extent, I examined the web and found the circulation perfect. I now divided the spine and destroyed the lower portion of the spinal marrow, and, to make doubly sure, cut through both sciatic nerves at their exit from the pelvis. The circulation was now very slow and turgid in both webs, owing to a degree of shock connected with the operation. As, however, the frog recovered from the ether, the circu-lation in the webs became stronger, and was ultimately fully restored; the arteries, nevertheless, remaining dilated and containing an excess of corpuscles. I now, with a pair of strong pliers, crushed the tibia and femur of one side, producing compound comminuted fractures. The circulation in the uninjured limb remained wholly unaffected; but, in the web of the fractured limb, the circulation was, from some cause, entirely arrested, possibly owing to some injury to the artery or vein, or to some direct action on the

muscular tissue of these structures or on the vaso-motor nerves."

Now, the frog is furnished with a ganglionic system, and the nervous system generally is proportionately large; yet, in the important experiment just described, a violent injury to a limb which was completely paralysed produced not the slightest effect on the heart or circulation generally. Possibly, opportunities may occur in the future of ascertaining in the human being the result of injury to paralysed parts.

Thus, shock may result from the agency of causes which operate on the nervous system primarily, or, in a limited number of cases, from causes which act primarily on the muscular tissue of the heart. But, still taking an anatomical view of the subject, there is another manner in which shock may be produced; and that is, by the operation of gradual cold, which appears to act equally and directly on all the structures—nervous, vascular, muscular, and others.

I pass now from these introductory considerations, which it will be essential to bear in mind, to the more practical aspects of shock, to the causes, and the phenomena, and the varieties, and the modes of termination of shock, as they present themselves to the surgeon.

Causes.

The *causes* of shock are very numerous, of very various characters, and diverse actions. They cannot well be classed under one category; nor is it necessary to detail every separate variety of injury, or the intensity or mode of its operation. All the causes of shock may be classed under four heads.

1. Those which act on the corporeal organisation.

2. Those which act on the psychical functions.

3. Those which act on both the corporeal and the psychical entities in equal or unequal degrees.

4. The fourth head comprises cold, which, although fully admitted by physiologists, has curiously escaped the attention of surgeons.

Cold will be more fully referred to in describing the modes of death in shock; it is sufficient at present to say of cold that it depresses equally and primarily all the manifestations of vitality. I have not deemed it necessary to make a separate class for those poisons, or causes of shock, which act directly on the muscular tissue, because they may, with sufficient accuracy, be classed under the first head. By far the larger number of cases of shock come under the third head, where more or less of mental influence is added to a severe bodily injury. Depressing mental influences are mostly called into operation in those cases where, for a longer or shorter period, the injury is forseen. But this prior knowledge is not essential, although it undoubtedly aggravates the effects of the injury. The mental causes, when consciousness is present, may operate simultaneously with the corporeal. I have observed that, if mental causes come into operation before an injury, and of themselves produce marked shock, such shock is not seriously aggravated by the injury. The nervous system is already in a condition in which its susceptibility to further depression is diminished. If, again, a man be the subject of severe shock from bodily injury, the psychical causes of shock are less active in their operation. A man whose leg has just been crushed hears with absolute and equal indifference the most terrible or the most joyful news.

The mode in which the causes of shock act will be more advantageously considered when it becomes necessary to treat of the causes or conditions which, to an important degree, modify the phenomena of shock. The relative importance of psychical and corporeal agencies will be more freely examined when railway accidents come under notice. A more correct estimate of the effects of railway accidents— which differ in important particulars to all others—will depend on the proper appreciation of the mental and bodily influences which come into play. An effort will be made later to ascertain what is peculiar, and why there is anything peculiar, in those most fearful catastrophes which from time to time strike terror into the public mind.

In the third category, then, those in which the mind, more or less, and sooner or later, influences the result, the causes are very numerous; extensive, even though superficial, burns; wounds which injure large portions of skin, and extensive injuries of the soft parts generally; compound fractures of large bones, especially of the thigh; crushes of the limbs, and amputations also, especially of the thigh; the traumatic gangrene which occasionally follows injuries of the limbs; the great majority of severe injuries on the battle field (where, in spite of bravery, there is also dread and anxiety); severe operations of any kind where there is much apprehension before an anæsthetic is given, or where it is imperfectly or not at all administered; injuries and resections which open the large joints, particularly the knee; injuries to the thorax or thoracic organs, heart, or lungs; injuries which implicate the abdominal organs, especially the liver, stomach or intestines, or wounds which merely penetrate its walls; intestinal obstruction, especially from mechanical causes, as internal or external strangulated hernia, intussusception, and twists. Irritant poisons, it has been well remarked, act in a similar manner to burns or irritants on the surface. Poisoned wounds and the bites of poisonous animals are often the causes of severe shock; injuries of the spine, crushes of the testicle, rupture of the eyeball, rupture of the bladder, rupture of the urethra, and extravasation of urine; hæmorrhage, intense and persistent pain—pain being always relative, and dependent on the nervous susceptibility of the individual. Injuries of the head are among the most important causes of shock, and will be again referred to as giving rise to peculiar modifications in the manifestation of its phenomena.

Those causes which act purely through the medium of the psychical functions are the more powerful emotions—joy, grief, anger, and fear. These, in rare cases, cause death; but in most cases it must be remembered that the violent emotion affects some already diseased organ, as the heart or brain. The antagonism or suspension of nerve-force will, however, again receive attention in the pathological examination of the question before us.

The causes which operate purely on the corporeal organisation are extremely rare, particularly if we exclude the influence of mental conditions which follow injuries. Yet there are cases where, with no mental alarm or despondency, shock is suddenly induced, as when a large or habitually distended bladder is completely emptied; also in cases of internal and unsuspected hæmorrhage, as in rupture of an internal aneurism, or the rupture which occurs in extrauterine fœtation. It may also be seen in injuries, or loss of blood, or the action of certain poisons in enthusiasts and in the insane, whose attention is drawn away from the injury. Under these circumstances, also, it is well to remember, it is often seen that severe injuries are accompanied by, it may be, trivial shock.

SYMPTOMS OF SHOCK.

IN describing shock, it is desirable to select a case where the intensity of the condition is of a striking and well marked character; for shock, like other deviations from health, presents every degree of intensity, from a condition so slight that its existence may be doubted, to one in which it can scarcely be distinguished from death. Suppose then, that a limb has been crushed—possibly the knee-joint opened, or a large portion of the skin of the trunk has been burnt, or the uterus has been extensively ruptured, or a small hernia has become suddenly strangulated, or the thigh has been amputated in the upper third or at the hip-joint: on examining the recipient of any such severe injury, we should in some cases find him as pale, as motionless, as indifferent to the outward world, as if the injury had already terminated in death. The pallor of the skin has the sickly white hue which only bloodless human skin is capable of presenting. The ruddiness of the lip has gone, and is replaced by a clearer and whiter tinge than that of the skin. The corneæ, in severe cases, are directed upwards, so that the whites of the eyes only are seen; but the altered axis of the eye is more apparant than real, because the upper lid is more or less depressed. The conjunctiva is lustreless, or even "glazed."

The features are smaller, especially the nose, the tip of which is constricted, and occasionally of a dusky colour, presenting a singular contrast to the rest of the face. The nostrils appear dilated. The lips are parted, and thin as well as pale. The whole countenance is so much changed, that recognition may be difficult to near relatives and friends. The surface of the body is everywhere cold to the touch; and, if consciousness be partially present, cold is also complained of. Small drops of moisture lie on the skin, especially of the forehead. The hands are blanched like the face; the fingers and nails exhibit a bluish colour, and are shrunk so that the skin on the palmar aspect lies in loose folds. Those parts of the body which are usually covered, though presenting less change of colour, are perceptibly whiter. There is marked inaction of the whole muscular system, the position of the body being either on the back, or, in extreme cases, in the position in which bystanders have placed it. In less severe cases, muscular action is impaired, but not absent. In cases where the shock is due to great but not sudden loss of blood, the stillness of the muscular system will be replaced by the tossing restlessness, and possibly delirium, so characteristic of unchecked hæmorrhage, either internal or on the surface of the body. It is commonly said, that the action of the heart is accelerated; it is certainly enfeebled, the pulse being also irregular and intermittent. But the pulse is not rapid in all cases. (I do not hesitate to say—and this question I shall examine later—that in every case of shock there is at first, and for a longer or shorter time, diminished frequency of the heart's action.) In strangulated hernia commonly, and in some injuries of the head, the pulse is often remarkably slow, descending to 40 or even 30 beats; yet in these cases we have the purest examples of shock, as regards the depression of the nervo-muscular force. In some cases the action of the heart may be so feeble, that neither it nor the pulse at the wrist can be detected. Consciousness, the intellect, and the sensibilities, are blunted, and the will paralysed; or it may be that consciousness, the intellect, the sensibilities, and the will, are extinguished for a time. Deglutition may be difficult, and the

contractility of the sphincters lost. The urinary secretion and glandular activity generally is arrested or retarded. The special senses are rendered more or less unimpressible. Articulation is imperfect, and the voice feeble or altogether lost. Respiration is feeble; but it becomes quickened with the pulse, though not in any fixed ratio. Its chief peculiarity is irregularity. Most of the inspirations are shallow and of the most varying degrees of rapidity. Sighing inspirations are frequent, but with no regular order of succession. Respiration may be so feeble as to be with difficulty detected. Deglutition is mostly possible as to fluids, and to solids thrust within the reach of the constrictors. Nausea and vomiting may also be present, but rarely in the most marked periods of shock. If the rectum be loaded at the occurrence of the injury, the contents will be spontaneously evacuated. The contents of the bladder are retained.

In the slighter forms of shock, the surface is cold, and the recipient of the injury complains, often repeatedly, of feeling cold. Muscular action is much impaired, but not suspended; indeed, impaired muscular action and enfeebled circulation are the most apparent characteristic indications of the slighter forms of shock. The pulse is feeble, intermittent, fluttering, and irregular. Respiration is shallow, with irregular sighs; the sighs being every second or third inspiration at one time, at the fifth or seventh at another, at the ninth or tenth at another. The brain, unless the injury have been direct to the head, is apparently active, especially if the position of the body be recumbent, but quite unequal to the higher efforts of the intelligence. Digestion, the intestinal peristaltic action, and gland-secretion, are all retarded. Nausea and vomiting often occur in this degree of shock.

Shock is not always proportionate in its intensity to the severity of the wound. It may be severe when the injury is slight, or it may be slight when the injury is severe. Many circumstances contribute to this apparent inequality in the operation of given causes. But this remark applies chiefly to the varieties of shock other than the most severe. In the most intense form of shock which is compatible with the

continuance of life, the nature of the injury, or the importance of the part injured, are usually of the gravest character. In cases of shock from mental emotion, if the result be not immediately fatal, the recovery from the severer symptoms is usually, though not always, rapid. There has been an antagonism of the nerve-force, which possibly may be recovered from before interchange of nerve-force has resulted in positive physical or chemical change, or, at least, before such physical or chemical change has rendered a return of nerve-force impossible.

In the severest forms of shock, from causes which act chiefly on the corporeal organisation, the injury is of the most serious, and often of a fatal character; and the shock, whether the injury be necessarily fatal or not, not unfrequently terminates in death. In such cases, several of the symptoms already described as occurring in the severer forms of shock are greatly aggravated. Coldness, palor, immobility, and insensibility, are extreme. The pulse and respiration are scarcely, if at all, perceptible. The excito-motor functions are gravely impaired. The lids do not close when the conjunctiva is irritated. Deglutition is not possible to fluids or solids placed within the grasp of the constrictors. The sphincters are completely relaxed, and the urine is retained. Under such circumstances, especially when the fifth and glosso-pharyngeal nerves fail to excite any response in the nerve-centres, the gravest fears may be entertained that respiration itself will momentarily cease.

The Thermometer in Shock.

In order to give greater precision to, and, if possible, to extend our knowledge of, the phenomena of shock, I have in numerous cases, a few of which I shall cite, made use of the thermometer by the axillary method, the advantages of which have been so ably enforced by Wunderlich.* It was long a tenet in physiology, that variations in temperature affect the surface only; and that the blood, as a

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* When these words were first penned, it was more common than it is now to acknowledge the services of Wunderlich.

whole, remains unaltered. The researches of Wunderlich, Parkes, Simon, and others, have shown that in inflammation, in febrile and other conditions, a considerable elevation of temperature above the normal heat of the blood is un-doubtedly experienced. The same observers have also arrived at the conclusion, that diminution in the temperature of the body is rare, and much less extensive in its range.

In several cases in which I have used the thermometer after severe operations, such as amputation of the thigh, the temperature has descended to 97° Fahr., more commonly to 97° and a few tenths; its descent below 97° is not frequent. A most interesting and striking fact, which I have found to occur in all amputations of the thigh, is this : that when the saw is applied to the bone, the moment it comes into action, the temperature of the body suddenly falls a fifth of a degree, a little more or a little less. No change is seen when the soft parts are cut ; and I have carefully investigated this point by the use of the thermometer in many cases of amputation of the thigh—an operation in which the cut surfaces of the soft tissues are perhaps larger than in any other operation. That the thermometer should register a diminution in the temperature when the saw is dividing the bone, is most remarkable, because of its comparatively scanty supply of nerves ; while the skin, so abundantly supplied with sentient or afferent nerves, gives rise, when cut with a knife, to no change in the temperature. The most probable explanation of this singular phenomenon is, the greater laceration of the nerves, smaller and fewer as they are, which instantaneously gives rise to shock, as indicated by depressed cardiac action and lowered temperature.

No change is seen in the thermometer on the adminis-tration of chloroform.

After the period of shock which immediately supervenes on a serious operation or injury, the temperature gradually rises, if the shock be not fatal, to a point above the normal standard corresponding to the degree of intensity of the fever of reaction. If the shock be fatal, the thermometer

does not usually fall below 97° Fahr. The fever of reaction, so far as I have been able to observe, differs from "medical" fevers in the temperature which it reaches prior to a fatal termination. While ordinary fevers reach a temperature varying from 106° to 110° just before death, the fever of shock, under similar circumstances, reaches a temperature only of 100° or 102°. Those cases of reaction are always the most dangerous in which the temperature keeps low, and especially at the early periods of fever. It must be acknowledged, however, that the current views of the relation of fever to septic agencies threaten to modify our opinions on the value or need of febrile reaction from shock. It is claimed for a strictly antiseptic method of treatment of injuries that it prevents a rise of temperature.

I append a few cases in illustration of the several conclusions I have brought forward. I shall give a tabular view of the cases, and comment upon them as I proceed. My observations, although mainly directed to the thermometric aspects of the cases, will extend to such other peculiarities as may seem to justify remark.

Tabular view of the case of Alice G., aged 22, showing the Temperature, and the condition of the Pulse and Respiration, just before, during, and at several periods shortly after, the operation of Resection of the Shoulder.

	Pulse.	Respiration.	Temp.
An hour prior to operation	92	18	98.8
Under chloroform...	92	Irregular	98.8
Incision in soft parts	92	Irregular	98.8
Application of saw to bone	{ Suddenly } { slower. }	Irregular	{ 98.8 { 98.6
When bone divided	92	Irregular	98.8
Fifteen minutes after operation... ...	82	16	98.0
Six hours after operation	108	22	102.0
Morning, second day	106	28	100.0
Evening, second day	126	30	102.4
Morning, third day	120	28	102.0
Evening, third day	128	30	102.4

This case reveals a very slight form of shock, the temperature of the body at no time descending below 98°

Fahrenheit. The sudden and momentary lowering of the temperature at the commencement of the sawing through the bone is very obvious. Reaction was rapid and sharp, and recovery favourable. The case was one of strumous osteitis affecting the head of the humerus, of three years' duration, numerous suppurating sinuses having been present for eighteen months.

Tabular view of the case of James S., aged 35, showing the Temperature, and the conditions of the Pulse and Respiration, shortly before, during, and shortly after, the operation of Amputation of the Thigh.

	Pulse.	Respiration.	Temp.
Shortly before amputation of thigh ...	120	28	99.2
During chloroform	120	Irregular	99.2
During incision in soft part	120	Irregular	99.2
On application of saw to bone	Suddenly slightly slower	Irregular	99.2 98.8
Operation completed	110	Irregular Slower	99.0
Thirty minutes after operation ...	105	30	96.4
One hour after operation	112	36	96.8
Eight hours after operation	140	40	97.0
Second day, morning	144	40	99.6
Second day, evening	156	38	102.0

This case shows a severe degree of shock, the thermometer descending to 96.4° Fahr. This and the other cases illustrate the disturbed relative frequency of the pulse and respiration which is very characteristic of shock. The cause no doubt lies in the direct influence which a violent impression on the nervous apparatus exercises on the respiratory function— an influence more or less independent of the condition of the systemic and pulmonary circulations. The table shows the reaction, at first gradual, and then rapid, which was formerly commonly seen in cases where the general health was moderately good, and the recovery favourable before the antiseptic epoch.

A tedious, irregular, and protracted febrile condition followed, which, nevertheless, slowly tended to the recovery which ultimately followed.

B

Tabular view of the case of Eliza S., aged 52, showing the Temperature, and conditions of Pulse and Respiration, shortly before, during, and shortly after, the operation of Amputation of the Thigh.

	Pulse.	Respiration.	Temp.
Before chloroform	110	26	97
During chloroform	110	26 Irreg.	97
During incision	110	26 Irreg.	97
Saw applied to bone and moment after...	Sudden slight fall	26 Irreg.	97 96.8
Bone divided	105	26 Irreg.	97
Fifteen minutes after operation ...	100	28	96.6
Sixty minutes after operation	108	28	97.8
Five hours after operation	96	25	97
Eight hours after operation	92	26	97.2
Eleven hours after operation	94	21	97.2

The case of Eliza S. is a striking contrast to the last, and shows well the different thermometric conditions in a case which is about to terminate unfavourably. The poor woman had been the subject of joint-disease (caries of the knee-joint) for several years. There were indications of the atheromatous diathesis, and suspicions of fatty change in the heart. The resulting shock was not severe; but reaction was late, and never marked; and she sank on the tenth day. Her nervous system was weak, excitable, and unhopeful. The thermometric record is most instructive, and unusual in the low temperature which preceded and followed shock. Indeed, shock from psychical causes seems to have been present before the operation; and this probably was the cause of the less marked change after the operation.

I may remark here, parenthetically, that I have been struck with the fact that shock seems to be a protection against shock. In other words, when shock is induced, either from psychical or corporeal causes, a second operation of such causes during the shock has little effect in aggravating it. The ultimate result, however, is not the less but the more unfavourable, as it is supposed to be seen in " primary " operations.

Appended is a tabular view of the observations during reaction, in the same case, to its unfavourable termination.

Tabular view of the case of Eliza S., showing the Temperature, Pulse, and Respiration, during reaction, to the fatal result.

	Pulse.	Resp.	Temp.
First day ...	96	25	97.0
Second day	120	26	98.4
Third day ...	116	24	99.0
Fourth day...	120	22	98.8
Fifth day ...	128	24	101.0
Sixth day ...	124	22	100.4
Seventh day	120	25	101.0
Eighth day...	126	24	101.4
Ninth day ...	124	22	101.0
Tenth day (death)	124	22	98.4

I regret that, in this case, only single thermometric observations were taken each day. The morning and evening variations, however, are less marked and more uncertain in the fever of reaction. Death probably followed prolonged shock, in a system unequal to bear it.

Tabular view of the case of Aaron B., aged 4, showing the Temperature, Pulse, and Respiration, shortly before, shortly after, and also during the early periods of Reaction which followed, the operation of Lithotomy (lateral method). Recovery.

	Pulse.	Resp.	Temp.
Before operation ...	100	20	98.8
Fifteen minutes after operation...			98.4
Six hours after operation	130	26	99.8
Second day, morning	120	20	100.0
Second day, evening	140	20	103.0
Third day, morning	136	22	100.2
Third day, evening	130	22	102.2
Fourth day, morning	116	20	99.8
Fourth day, evening	100	20	100.8
Fifth day, morning	96	20	.99.4

This case shows the effects of the operation of lithotomy in a moderately healthy boy of four. The temperature does not get below 98°. Reaction is seen to be quick and high, with also quick subsidence. The morning and evening variations are more regular.

Tabular view of the case of Joseph W., showing the Temperature shortly before, during, shortly after, and at other periods after, Amputation of the Thigh. Recovery.

	Temp.
Before chloroform	98.4
Under chloroform during incision	98.4
Saw applied, and moment after	{ 98.4 / 98.2
Fifteen minutes after operation	97.0
Sixty minutes after	97.8
Six hours after	98.5
Second morning	99.2
Second evening	99.4

The case of Joseph W. is interesting as showing the effects of shock on a boy of ten, who was in a state of extreme weakness at the time of operation, from the effects of acute periostitis of shaft of femur three months before, and from which he narrowly escaped with his life. The table, marked in tenths of a degree, shows the sudden fall of the temperature one-tenth of a degree when the saw commenced to divide the bone. The phenomena of shock was very marked. The thermometer rapidly went down to 97° Fahrenheit, but not lower. Reaction was quick, but not very high. Recovery followed.

Tabular view of the Temperature the evening before, shortly before, shortly after, and at repeated intervals after, Removal of the Breast. Case, Bridget F., aged 47. Scirrhous Cancer of Breast.

	Pulse.	Resp.	Temp.
Evening before operation	82	—	98.5
Shortly before operation	—	—	98.0
Three hours after operation	80	—	97.5
Six hours after operation...	88	31	97.6
Second morning	104	25	99.0
Second evening	92	29	98.8
Third morning	105	32	98.8
Third evening	108	24	100.4
Fourth morning	108	30	100.4
Fourth evening	110	28	100.0
Fifth morning	95	24	99.2
Fifth evening	100	30	98.4
Sixth morning	98	23	98.0
Sixth evening	98	21	98.9

The case of Bridget F. shows slight mental shock just before operation. The next thermometric observation was too late

to get the full reduction in temperature. The reaction was somewhat irregular, owing, apparently, to the highly emotional temperature of the patient—an Irishwoman. More than once she said she was going to die. We could detect no ground for such fears but elevation of temperature: in short, increased fever followed. The case recovered.

Tabular view of the case of William F., aged 14, suffering from internal injury' probably Contusion of the Liver.

						Pulse.	Resp.	Temp.
Noon, two hours after injury	...	...	...	...	112	41	97
First evening	...	...	...	...	...	124	33	100.5
Second morning	...	...	...	...	...	136	38	102.0
Second evening	...	...	...	...	...	132	33	102.6
Third morning	...	...	...	...	...	128	36	100.6
Third evening	...	...	...	...	...	128	40	102.6
Fourth morning	...	...	...	...	...	104	29	100.2
Fourth evening	...	...	...	...	...	106	32	101.4
Fifth morning	...	...	...	...	...	96	27	100.2
Fifth evening	...	...	...	...	...	100	24	100.4
Sixth morning	...	...	...	...	...	98	26	100.0
Sixth evening	...	...	...	...	...	104	33	101.0
Seventh morning	...	...	...	...	...	96	28	100.0
Seventh evening	...	...	...	...	...	100	32	101.9
Eighth morning	...	...	...	...	...	88	26	99.6
Eighth evening	...	...	...	...	...	90	31	100.4
Ninth morning	...	...	...	...	...	88	26	99.6
Ninth evening	...	...	...	...	...	92	31	100.2

William F., aged 14, was knocked down by a heavy weight, and was brought into hospital with marked collapse. The locality of the pain and tenderness and other symptoms appeared to point to injury to the liver. The table shows marked and very slowly subsiding reaction. The case was left progressing.

The cases which I have brought forward, and others which I have carefully examined, suggest the following conclusions as regards the use of the thermometer in shock.

1. The temperature in the fever of reaction should rise shortly after the injury or operation, but with antiseptic treatment this need not be more than one or two degrees.

2. When the temperature, especially after being low for some time, rises above 103°, to 105° or 106°, a fatal termination is to be feared. But more commonly, in death after injury, the temperature fails to reach to these degrees.

3. The temperature is not altered by the administration of chloroform.

4. The temperature is not affected by incisions in the soft parts, however extensive. This conclusion is based on cases in which the incisions were made when the patient was under the influence of chloroform.

5. The temperature instantaneously falls when the long bones are divided with the saw. The diminution of temperature is from one to four tenths of a degree (Fahrenheit.)

6. The temperature falls, in severe shock in the adult, to 97° or even 96°, rarely lower. In the young it does not fall as low as in the adult; it falls lowest in the aged.

7. The correspondence between the temperature and the pulse, and especially between the pulse and the respiration, is less in the fever of shock than in "medical fevers."

8. The thermometer furnishes the most reliable information (more than the state of the pulse and respiration) of the real nature of shock and reaction, and its data afford the safest grounds for prognosis.

THE SPHYGMOGRAPH IN SHOCK.

THERE can be no doubt that while in shock, as a rule with very few exceptions, the impression of a severe injury is made first on the nervous system, most of the more marked phenomena are due to the secondary effects of the injury on the heart, and consequently on the circulation generally. Indeed, the degree of enfeeblement of the action of the heart will serve as a fair index of the reduction of vitality generally. It cannot, further, be denied that the sphygmograph, as perfected by M. Marey, gives the only certain mode of estimating the degree of enfeeblement, or, indeed, of any other change in the heart's action.

The character of the pulse is affected by several conditions, which affect its character and modify the trace written by the sphygmograph on paper. These conditions are, the propulsive power of the heart, the degree of rigidity of the arterial walls, and the facility with which the blood is propelled through the capillaries. In shock, the degree of propulsive power of the heart will be indicated by the length of the line

of ascent, which commences the trace of a single cardiac impulse. It is obvious, however, that where the arterial walls are maintained in a state of tension by any difficulty in the passage of the blood through the capillaries, the ascent of the trace will be correspondingly shortened, and the line of descent also will be made more or less irregularly convex. In experiments which have been made at my request, to illustrate certain questions in the consideration of shock, it was found that in certain injuries, or even under mental emotion, the capillary circulation was arrested in the frog's foot, together with the circulation in the larger vessels. When reaction occurred, it was found, in the more severe injuries, that for some time the blood only circulated in the larger trunks as far as the capillaries. In shock, the impaired circulation in the capillaries is no doubt due mainly to the weakened propulsive power of the heart. That it is so altogether, is doubtful. The coldness which is present in shock probably leads to contraction of the smaller vessels and capillaries. But, although the capillary circulation is impeded, there can be little doubt that the feebleness of the heart's action prevents any considerable approach to a state of tension in the arteries.

The second pulse-trace given below was taken from a man whose thigh had been amputated half an hour previously. The shock was not severe, and was already becoming less intense, while the nervous system was extremely unimpressible.

In a case of shock where the pulse is sufficiently powerful to act on the lever of the sphygmograph, the elevation of the line of ascent may be fairly taken as an indication of the force of the heart's action, and as an index of the intensity of the shock.

The sphygmographic tracings here represented are selected from those taken before operation, shortly after, and also from those taken during reaction.

The first trace was taken half an hour before the operation of amputation of the thigh. It presents some irregularity,

especially in the dicrotism, and illustrates that slight degree (in this case very slight, for the patient was remarkably free from the excitable, emotional, nervous temperament) of shock from the operation of psychical causes which is likely to be present half an hour before an important operation.

The second trace was taken one hour and twenty minutes after the operation—a little too late to represent the greatest severity of the shock. The much shorter ascent of the lever, as represented, shows very forcibly the diminished propulsive power of the heart; but it also shows greater regularity, as well as feebler action of the heart. This unexpected peculiarity may perhaps be attributed to the diminished influence of mental causes, due partly to the shock to the nervous system, and partly to the still lingering effects of chloroform. There is also less concavity in the general descent of the trace, which is most probably caused by the impeded transmission of the blood through the capillaries, which, as the experiments I have to bring forward will show, is prone to occur in shock. It may also be partly due to the fact that, in consequence of the removal of a large part of the body, there is relatively more blood in the vessels.

The following trace was taken for me by my friend and (then) colleague Dr. Foster, on the morning of the second day. The difference between this and the last is very notice-

able, not so much in the line of ascent, which is only slightly higher, but in the roundness of the junction of the ascending and descending lines, and still more so in the greater distinctness of the dicrotism, which forms a distinct second elevation, and which is very characteristic of fever.

It is not necessary for me to dwell on the advantages to be derived from the use of the sphygmograph in medicine and surgery. The impression made on the finger by the pulse is

so much less certain and decisive, that opinions formed on this basis possess only a relative value. If six able and experienced physicians were to feel any given pulse, and were invited to write a description of it, they would give six accounts, not two of which would closely resemble each other. The sphygmograph alone gives a description clear, accurate, and beyond dispute. The importance, then, of obtaining the sphygmographic characters of the pulse in many deviations from health is too obvious to require comment. The trace which I have given of the pulse in shock is peculiar, and differs from any other condition of the pulse.

This trace was taken half an hour before amputation below the knee. The roundness of the junction of the lines of ascent and descent denotes an atheromatous state of the arteries. The next trace was taken in the same case under the

influence of chloroform. It is of extreme interest, from the increased length of the line of ascent, caused partly by diminished tension of the walls of the vessels, and partly, no doubt, to the increased propulsive power of the heart—a fact quite opposed to the popular view of the effect of anæsthesia.

The preceding three short traces were taken with difficulty on the operating table in the same case. The first was taken immediately before the application of the saw, the second during the action of the saw, and the third immediately after the bone was divided. The latter two exhibit marked shock from the action of the saw.

Two or three minutes later, the above was taken, which

shows that the heart had already acquired greater strength of action. The two succeeding traces were taken, one five
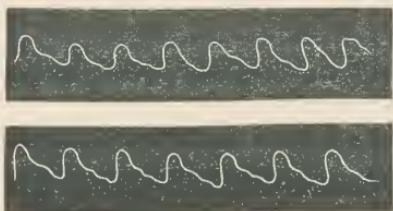
minutes later, and the other ten minutes later. Both show how rapidly re-action occurs in the heart and circulation.

The above trace was taken on the morning of the second day, when re-action had set in. The traces of the above case were kindly taken by Dr. Foster; those taken on the operating table were, for obvious reasons, obtained with difficulty.

The two following traces were taken from a case of excision of the breast. The first was taken two hours before and the second five hours after the operation.

VARIETIES OF SHOCK, AND THE CIRCUMSTANCES WHICH MODIFY ITS PHENOMENA.

The varieties of shock depend on conditions which it is now necessary to describe. These conditions are sometimes combined in the most complicated manner, and the result may be of an equally complex character.

The peculiar condition which, more than any other, influences the degree of intensity of shock, is the *susceptibility or excitability of the nervous system.* The expression, "nervous temperament," as commonly used, describes a large number of persons, whose manifestations and character of nervous action are greatly influenced by external causes.

If a person with such a temperament meet with an injury, the results are all more marked than in a person with a different nervous constitution suffering from a precisely similar injury. The first may appear on the point of death; the second may seem almost free from shock. It is in the nervous temperament that syncope is so prone to occur. The "sight of blood," or a trifling injury, especially if acutely painful, will suddenly so act on the heart that it fails to send sufficient blood to the brain, which, in warm-blooded animals, requires incessant nutrition for the uninterrupted manifestation of nerve force. Although syncope from loss of blood may occur in many different nervous constitutions, if the loss be sufficiently copious, and especially if it occur in the upright posture, it is chiefly met with in the "nervous" of both sexes. The nervous susceptibility of men, and the frequency of hysteria (if such a term may be used) in men, is, I believe, not fully recognised; it is in such men that syncope from mental or corporeal causes is most likely to occur. Besides the degree of sensitiveness of the nervous system generally, it is well to consider the influence which states of mind that are present during the reception of an injury exert on the degree and nature of shock. It has been already remarked that, in certain temperaments, wrought into a state of extreme excitement, a comparatively severe injury may not be attended with that degree of shock which, under other circumstances, would be seen. In those cases, however, shock is usually deferred, and not altogether averted; and it may be all the more severe, seeing that reactionary mental exhaustion, itself a kind of shock, is superadded to the effects of bodily injury. In the great majority of cases of shock, it is probable that an extreme and indefinable dread accompanies the injury and greatly aggravates the intensity of the shock. In cases where it is possible to obtain a hopeful and calm state of mind, as in certain surgical operations, a most favourable influence on the phenomena of shock is seen. Pain, when severe and protracted, affects the mind in a manner similar to powerful emotions, and, like them, is at once a cause in some cases

and a serious modifying agent in others, of depression or metamorphosis of nerve-force.

Injury to the head gives rise to a variety of shock which is very peculiar. As might be anticipated, direct injury to the large nervous centres has results different from those which follow injury to the peripheral nervous expansion. In the first case, in a degree proportionate to the severity of the case, there is much more marked impairment or suspension of cerebral action. Consciousness, intelligence, and the emotions, are more in abeyance, while the sensori-motor and the excito-motor functions are slightly, or, it may be, not at all, impaired, although in the severest injuries even these are implicated. In an injury to the peripheral or sentient nervous expansion, the cerebral functions are less affected, and the consensual and reflex functions more than in direct violence to the nerve-centres, and yet, in such cases, the injury may be of a much graver character. A stun to the nerve-centres themselves may thus give rise to apparently more intense shock, while a crushed limb, with less impairment of the intellect, may be a more fatal injury. At the same time, injuries to the head, because of the vast importance of the nerve-centres to all the actions which constitute life, are among the most important injuries which can be inflicted. The outward manifestations of injury are alarming, even when the injury is slight; but it is the one essential part of the animal which is injured.

Injuries of the head, having peculiar characters because they are inflicted on the nervous centres directly, have been considered first and separately. In other localities, the results of injury are more, but not absolutely, uniform as regards the character of shock. One of the profoundest forms of shock is that which attends extensive injuries to the skin. This is perfectly consistent with our knowledge of the anatomy and physiology of the nervous system. The immediate effects of an injury are unquestionably exerted on the nerve-centres through the medium of the afferent or

sentient nerves, and these are especially numerous on the integumentary system. Surgeons well know, practically, that by far the most painful part of all operations is that which involves the skin. Mr. G. H. Lewes has shown that, in the frog, if the brain be removed, sensation is not affected; but, if the skin be removed also, no trace of sensation is left, so completely is the sentient nerve-apparatus vested in the skin.

Injuries of the lungs, and particularly of the heart, are accompanied by great shock. Injuries of the abdomen, whether perforating or implicating the viscera, or both, are marked by extreme shock—shock more severe, as Mr. Longmore has pointed out, than an injury which opens the thorax or involves the lungs. This can only be explained by the impression made upon the cerebro-spinal system through the medium of the sympathetic. It has already been pointed out, that shock from blows on the epigastrium, when the stomach is distended, can be best explained by referring it to a sudden and violent impression on the pneumogastric nerves, seeing that physiological experiment establishes the fact, that the influence of the vagus upon the heart is of an inhibitory character.

THE INFLUENCE OF SEX ON SHOCK.

It is commonly supposed, that females suffer from a severer form of shock than males—the injuries in the two cases being similar. This seems not unnatural, when we consider that the health of women, during the child-bearing period, is subject to varying physiological conditions, which are very prone to pass over the line which separates physiological from pathological action. It is reasonable to suppose, also, that the more emotional character of the female renders her more susceptible to the influence of the several causes of shock, and particularly those which operate upon the psychical functions. At the same time, the views commonly taught are rather those of surmise and opinion than the results of careful observation. I do not hesitate to say, that there is no evidence to show that a woman of good

health, suffering from the immediate effects of severe injury, is in a worse position than a man of similar health suffering from a similar injury. I will go further, "other things being equal," I believe that a woman bears injuries better than a man. I am now presuming that in the average woman the nervous system is less taxed than in the man. This presumption may not be tenable much longer. I trust, I have shewn enough of the utility of the thermometer and the sphygmograph to lead to the conviction that, with their assistance, we shall, in the future, by careful and repeated observation, be able to arrive at much more definite and precise knowledge of the varying degrees, and characters, and modifying causes of shock. In this way, the influence of sex, age, prior disease, and the locality or nature of any given operation, or injury, may be more completely ascertained.

THE EFFECT OF AGE ON SHOCK.

It is commonly assumed, that the effects of injury are greater in the young and the old than in the middle period of life. Old age is confessedly a very relative condition, and cannot be measured by years only. One man at eighty, hale, free from disease, will often bear a given injury better than another man at sixty; the latter being practically feebler and more worn out than the former. Merely advanced age, presuming that it is not extreme, with a sound condition of the organs from temperate habits and conditions habitually favourable to health, often bears shock remarkably well. This is often seen in strangulated hernia, where the collapse which attends gangrenous intestine and the formation of an artificial anus often appears less intense in the aged than when these conditions occur in earlier life. Nevertheless, the decline of life is in itself unfavourable to the effects of injury. The effect of prior disease on shock is mostly unfavourable as regards the severity of shock; but it is rare (and consequently very rare in injury) to meet with old age perfectly free from disease. The material substrata (to borrow a phrase from physical science) of the several vital forces

become less perfect in their physical organisation; and the forces of which they are the media are also less active and less normal in their character. When old age is associated with actual disease, especially disease of essential organs, then shock is greatly aggravated, and a fatal result much more readily ensues. A striking peculiarity in the shock of the aged is the uncertainty of its progress and termination. Often the shock seems less intense, but much more persistent; often it is of a varying character, and, when we least expect it, it may prove suddenly fatal. Shock in the old is not so immediately grave, but prospectively it is infinitely more so.

In the consideration of shock in the young, I find myself compelled to differ completely from our recognised surgical authorities. On this subject, therefore, although I shall not hesitate to express my opinions, I shall speak with diffidence, and shall be prepared for correction. Further, in presuming to put forward an opinion which is the reverse of all prior doctrine, I have endeavoured to support it by careful observation and repeated experiments. It is taught, then, that the young, as well as the old, bear injury worse than the adult; but it is admitted that, if the young subject does recover from shock, the recovery is more rapid than in the adult. That greater shock should be followed by more rapid recovery, is a somewhat anomalous proposition; but it cannot be discussed here. It is necessary distinctly to bear in mind that, in considering this subject, the nature and the extent of the injury must be in proportion to the age and size of the child. An illustration or two will better exemplify my meaning. If two bullets of similar size be shot, one through the thorax of a baby and the other through the thorax of an adult, if the man be twelve times larger than the child, the injury is twelve times greater in extent in the child, presuming the route and the locality of the injury to be the same. It would, of course, be an useless parallel if in one case the bullet traversed the root of the lung and in the other the periphery merely. If a child of one stone weight and a man of twelve stones each lose a tablespoonful of blood, the injury in the child is twelve times as serious as in

the adult. The same remark applies to diarrhœa, and to suppurative and other discharges.

If we go back to intra-uterine life, although the conditions here are possibly more favourable as regards the absence of atmospheric influences, while there can, of course, be no rest, and no surgical appliances or assistance, we find injuries better tolerated, such as amputations, and compound fractures. It is curious, too, that we find congenital conditions of a surgical nature, such as spina bifida and others, which, although tolerated easily in the infant, are incompatible, as a rule, with adult life. Operations for strangulated hernia and hare-lip (considered simply as a wound—as a remedy for deformity some delay is preferable) do as well a few days, or even hours, after birth as later. Lithotomy in children, as is well known, is only fatal in exceptional cases. There is another operation which leaves—in my mind, at least—no doubt of the greater immunity from shock in children. It is well known that, in the adult, any operation for artificial anus which involves opening the peritoneum is almost uniformly fatal, and that, therefore, surgeons invariably prefer Amussat's operation, as one which leaves the peritoneum uninjured; but statistics have shown in the clearest manner that, in the newly born, the peritoneum, as in Littre's operation, may be opened, and the intestine also opened, with a success quite as great as in colotomy. In the views which I now advance, I speak strictly of shock from injuries which act on the nervous system; for it is a well known and most interesting fact, of the truth of which I have completely satisfied myself, that the young of all animals bear cold worse than the adult. This fact by no means contradicts the other experiments which I shall bring forward, showing the greater toleration in the young of shock from injury; but, indeed, rather confirms them, because it confirms the physiological principles which I shall adduce in explanation. In speaking of the modes of death in shock, I shall have to describe the mode of death from cold, as differing from all others in this respect, that it acts directly on the circulatory and on all the organs equally with the nervous system.

Let us see now what are the results of experiments bearing on this subject which have been most carefully performed by my friend Dr. Norris. An adult white mouse was decapitated instantaneously with a sharp chisel, and death occurred immediately with a single struggle. The experiment was repeated several times, and always with the same result. A young white mouse was treated precisely in a similar manner; but life, as indicated by reflex action and struggles, was continued for about twenty minutes. The experiment on young white mice of several ages was also repeated, with this invariable result: *the younger the mouse, the longer was life prolonged,* and the greater was the vitality. The heads of several adult frogs were instantaneously removed: slight convulsions ensued for one or two minutes; then followed a period of absolute quiescence or shock, with absence of excito-motor irritability, which continued about fifteen minutes. At the expiration of the period of shock just stated, the legs were gradually drawn up, and shortly ordinary movements were executed. The same experiment was repeatedly performed on young frogs; and in these the period of shock was much shorter in duration, and in the youngest was scarcely, if at all, perceptible. In several frogs, the capillary circulation was examined in the webs. When the head was removed, the circulation being examined at the same moment by the microscope, it was found that the capillary circulation, and the circulation generally, was immediately suspended, with occasionally some oscillatory or even reversed movement in the capillaries. In a variable number of minutes, the circulation was resumed, at first by irregular, and then by regular, movements, gradually established. In the young frog—and Dr. Norris examined one not exceeding a quarter of an inch in length—the capillary appearances were the same, except in the very much earlier return of regular circulation. An important class of experiments, performed by physiologists on warm-blooded animals, confirms the conclusions which may be drawn from the experiments just described. It is only in young animals that experiments can be performed to ascertain the character

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of reflex movements. In adult warm-blooded animals, life cannot be sustained under the conditions requisite to obtain purely excito-motor action.

It cannot be assumed, unless all physiological experiments be worthless, that the relation of the human infant to the human adult differs fundamentally from the same relation in the creatures experimented upon. This, then, is a legitimate conclusion: the younger the human being, going back even to intra-uterine life, the less the shock from injuries or operations.

The explanation which I offer of these apparently singular and assuredly most interesting facts is one which I think is forced upon us by the present state of our physiological knowledge. There is no principle in the science of life more certain than this: the lower the organisation of any living creature, the greater is its tenacity of life. In other words, the more lowly organised creatures can sustain life under conditions that would be destructive to life in the higher organisations. We have already seen that the frog can sustain life, and manifest the ordinary indications of life, in a decapitated state. This, we saw, was not practicable in the adult of any mammal. We may go lower and lower in the scale of organisation, until we come to living things so tenacious of life that, if the head be severed from the body, the head will form itself a new body, and the body a new head; or, if the creature be cut into fragments, each piece will form for itself both a body and a head. It is acknowledged by all observers that warm-blooded animals, in a state of hybernation, approximate in many particulars to the cold-blooded, and especially in their greater resistance to injury and unfavourable conditions generally. It may, therefore, be stated as a correct generalisation, that, the lower the manifestation of vitality, so far as this is tantamount to the manifestation of nervo-muscular force, the less the susceptibility to shock from injury.

I would suggest, then, so far as regards the susceptibility to shock from injury, that, in children, and in a certain class of diseases to which I shall have occasion to refer—namely, those which lower all the manifestations of vitality

without impairing the integrity of the essential organs—there is a greater or less approximation to the state of hybernation, and to the condition of the cold-blooded animals. There is so much torpor in the action of the forces of life, that injury is better resisted, and its effects are not accompanied by that depression which is the more intense where nervo-muscular force is itself the more vigorously manifest. On this principle, the person with old joint-disease, worn to mental and bodily torpor, and the young child, whose force is developmental rather than nervous or muscular, bear operations and injuries better than a man in the prime of life, whose every organ and function are subservient to the exercise of nerve-force. In such a man, the nerve-force is most predominant; if such a man receives an injury, the nerve-force is reduced to a condition of the greatest torpor. Shock is essentially a depression or metamorphosis of nerve-force. Where nerve-force is predominant shock also becomes predominant.

In the young, as I have remarked, the forces of development and growth are much more active than the nervous or the muscular. It is well known that, where growth is in excess, nervo-muscular force is deficient. Shock acts by altering or depressing nerve-force. In the young, there is less nerve-force to alter or depress; and, consequently, the effects of such lessened depression or shock become unmistakeably obvious. This law, if I may call it such, of "less nerve-force, less shock," receives support from the fact that the forces of growth and development in the young, which are so predominant, require the presence of more favourable conditions, and which can be spared less easily than in the adult. Where injury or shock interferes with these conditions, in so much does it become important, and in so much should it influence the mode of treatment, which ought always to be of a character to favour growth and development. Whatever children may bear in the way of operations, *they cannot bear the absence of warmth and food.*

THE EFFECTS OF PRIOR DISEASE ON SHOCK.

It has been supposed, without sufficient discrimination of the nature of the disease, that the presence of disease in a person who sustains an injury, very seriously aggravates the severity and the danger of the resulting shock. This want of discrimination has led surgical writers into this anomalous position. It is asserted that shock is more fatal in disease; it is also asserted that amputation of the thigh for injury is more fatal than amputation of the thigh for disease. The suggested explanation of this contradiction is very inadequate. It is said that shock is double, there being first the shock of the injury, which is supposed to be all the greater because it comes suddenly, without anticipation and without preparation; and then the shock of the operation. I have already put forward the proposition that shock is more or less a protection against shock; that the shock of a first injury is only slightly aggravated by the occurrence of a second. I will not, however, say that the shock is not rendered more dangerous in its result, but merely that the phenomena of shock are not materially augmented in intensity. But, turning from this view, it may fairly be said that, in certain cases (where the mortality is certainly not less), the operation or second injury is a very trifling one—possibly a mere trimming or closure of a wound. In other cases, again, the operation so immediately follows the injury, that the shock is only single. Where an anæsthetic is given, too, the phenomena of the shock of the first injury actually diminish in intensity while the second is being inflicted; the pulse, respiration, and temperature becoming more natural under the influence of an anæsthetic. I fully admit that the operation of psychical causes in these cases has a material effect on the issue; because, as I have stated in speaking of the effects of injuries in the young, I believe it is the supremacy of nerve-function at the time of injury which renders it so much more fatal.

A more correct estimate of the influence of disease prior to shock may be arrived at by dividing them into two classes.

All the diseases which may be present during the infliction of an injury may be thus classed : 1. Those which affect organs the integrity of which is essential to life, such as the heart and its great vessels, the lungs, the brain, the kidneys, and the liver in less degree, and intestinal canal. Daily observation leaves no doubt that severe injuries or operations on the subjects of cardiac or pulmonary disease are greatly more serious in their results than similar injuries or operations in a state of health. Disease of the kidneys is, perhaps, the commonest cause of fatal shock in many operations; indeed, where it is present, no operation is free from risk. This remark particularly applies to operations on the urinary organs, as the urethra and bladder; although probably this is because operations on the urethra, as in stricture, or on the bladder, as in stone, are more frequent in renal disease—the renal disease itself frequently being a consequence of the condition which the operation is intended to relieve. The second class includes those diseases which do not affect the vital organs, such as diseases of the extremities, which merely depress the general sum of vitality, without specifically impairing the integrity of any anatomical system. Protracted joint-disease, for example, gives rise to marked emaciation and undoubted debility of the muscular and nervous functions. It is well known that amputation of the thigh for protracted disease of the knee is much more favourable in its results than is amputation of the thigh for injury. I have already given what appears to me the best explanation of these facts in discussing the character of shock in children.

SHOCK IN INJURIES FROM RAILWAY ACCIDENTS.

The shock which follows injures in railway accidents presents, both as regards its cause and its results, so many peculiarities, that it is well to consider them separately though briefly. The principle feature in railway injuries is the combination of the psychical and corporeal elements in the causation of shock, in such a manner that the former or psychical element is always present in its most intense and violent form. The incidents of a railway accident contribute

to form a combination of the most terrible circumstances which it is possible for the mind to conceive. The vastness of the destructive forces, the magnitude of the results, the imminent danger to the lives of numbers of human beings, and the hopelessness of escape from the danger, give rise to emotions which in themselves are quite sufficient to produce shock, or even death itself. Syncope, or concussion of the brain, may destroy consciousness for a time, or possibly altogether; but, if consciousness return, depressing influences still operate, although less injuriously, but on a blunted nerve-power. All that the most powerful impression on the nervous system can effect, is effected in a railway accident, and this quite irrespectively of the extent or importance of the bodily injury. Indeed, if there be no bodily injury whatever, the shock may nevertheless be intense, and be followed by ulterior results, the nature and mode of termination of which it may be difficult to foresee. With the fullest extent of mental shock, the extent of bodily injury may vary greatly—from an abrasion of the skin to the crushing of the body into a shapeless mass. The most frequent complication of local injury, independently of the psychical element of shock, is direct injury to the nervous centres. It is natural that the trunk and the head should be most liable to injury in railway accidents, where the body is thrown, as a whole, violently into contact with surrounding objects. The direction in which the body is thrown, as regards the resulting injury to the spinal cord, appears to matter little. The direct effect is concussion, as indicated in some cases by immediate impairment of its functions of sensation, motion, and control of the sphincters. The effect of the violence to the spine may be something more than concussion ; vessels (and the arterial and venous systems connected with the spinal cord are peculiarly large and important) may be ruptured; or the substance of the cord, or the nerves at their origins, may be torn. When the vessels are ruptured, the effects are only developed with time—it may be hours, or it may be days. But these lesions, incalculable as their importance is, and their several sequelæ,

inflammation, the softening of inflammation, and the softening of deficient nutrition, are removed from the question of shock, which is the more immediate result of the primary injury. It is common in surgical works to find concussion of the spinal cord described as a condition which comes on gradually, and at a variable period after the accident. I venture here to use the word concussion of the cord in a manner analogous to that in which it is used in discussing injuries of the head. There can be no doubt that the cases of so-called concussion of the spine, which do not immediately follow the injury, are in reality cases of hæmorrhage implicating the spinal cord. Shock from severe concussion of the cord high up may prove immediately fatal. The following is a case in illustration. A man, to whom I was called, had discharged a pistol into his mouth, and immediately died. Examination of the body showed that the bullet struck the body of the second cervical vertebra; but, beyond slight laceration of the tongue and of the upper part of the larynx and pharynx, no injury was done; no vertebral or any other bone was broken. The naked eye could detect no change in the upper part of the cord or the membranes. It was supposed that the pistol contained very little powder. Injuries of the cord lower down are not often immediately fatal from shock; but it is a singular feature in these cases, that the shock is remarkably persistent, and this quite independently of any peculiar way in which the injury may have been inflicted, although it is a condition which is frequently found after railway accidents. Probably, however, the physical changes, which undoubtedly occur in all cases of concussion and shock, are followed by others—congestion, inflammation, and degeneration—which, when occurring in the brain or the spinal cord, explain many of the ulterior effects of injuries, especially railway injuries, as insanity, paralysis, spasm, epilepsy, and the more limited lesions of local pain, local paralysis, or local loss of sensation.

THE ULTERIOR EFFECTS OF SHOCK.

THE ulterior effects of injuries to any part of the body are of the greatest importance to the surgeon. They follow at longer or shorter periods after shock. It is necessary to

distinguish between the ulterior effects of shock and the ulterior effects of the injury which produced the shock. In speaking of the modes of death from shock, I shall have to observe that, in some cases, it is due to an altered state of the blood—the instantaneous result of a violent impression on the nervous system. To those who are familiar with physiological science, it is not necessary to dwell on the proofs that changes take place in the blood in the shock which follows intense emotion. In such cases, the secretions are generally altered, and often have a different odour—a condition frequently marked in the perspiration in slight shock from mental causes. The well-known case of a soldier's wife is often quoted. Her husband was suddenly attacked and his life endangered. She threw herself between the combatants. Shortly afterwards, her baby, having been put to the breast, fell back and died. An eminent physiologist pertinently asks if the blood may not be suddenly so changed as to be no longer a nutritive fluid, but a deadly poison. In cases where shock is less intense, changes occur in the blood which are not fatal, but which may show themselves later in local inflammatory and degenerative conditions.

It is extremely probable that one or two of the principal forms of pyæmia may be produced by shock, whether induced by psychical or corporeal causes, or by both. The first variety has just been referred to, in speaking of the generation of a noxious fluid in the blood as the result of shock. Such a state of the blood may disturb all the organs and functions to a considerable extent, and give rise to local inflammations, diffused abscesses, cellulitis, or inflammation of the serous membranes. In the second class of cases, there appears no doubt that in the state of shock, certainly in its syncopal forms and those which assume the character of protracted asthenia or debility, there is a disposition to the formation of coagula in the heart or blood-vessels, which are driven by the circulating blood to different parts of the body, according to the direction of the current, arterial or venous, and the size of the vessels and coagula. To the formation of clot (thrombosis), and its dislodgment and altered locality (embolism), many

complex and otherwise inexplicable conditions are due. My own observation has led me to entertain a strong conviction that the embolic as well as the ichorrhæmic forms of pyæmia are often traceable to shock, rather than to any other cause.

CHRONIC SHOCK OR ASTHENIA.

This is a condition which occasionally follows injury, the degree of which, as in shock generally, is not always in proportion to the severity of the injury. It appears to be a permanent, often a constantly increasing debility, which can be referred to no cause other than injury; in other words, it appears to be shock, the phenomena of which are less intense, but more persistent. In fatal cases, a *post mortem* examination throws no light on the cause of death. The following case was one of the kind. The injury was severe but the shock was never of an intense character. A poor weak woman, prematurely old at fifty, was barbarously assaulted by her husband, who beat her with a poker, and fractured the upper jaw, so that a large portion was loose and moveable in the fingers. She never regained her previous health, but very gradually became feebler until she died, about ten weeks after the injury. No effort was made at repair in the fracture, and at no time was there any febrile action. It is not improbable that further knowledge will discover some specific cause of death in many of these cases; but it is also equally probable that many cases will remain which can only be regarded as cases in which shock is not instantaneously fatal, but only gradually though uninterruptedly passes to a fatal termination.

It is not contended that no physical changes are present in the nervous or other structures, because it will not be contended in these pages that any change of force, nervous or otherwise, can be manifested in an unchanged material organ; but the changes in the prolonged shock are probably similar in character to those which occur in the more rapidly fatal forms.

The Physiological and Pathological Examination of the Symptoms of Shock.

This requires consideration, not only because of its intrinsic importance and interest, but because also this part of our subject will furnish the most philosophical data for treatment.

Dynamical pathology can scarcely be said to exist at present. The reason is to be found in the still early state of our knowledge of dynamics as applied to physiology. Reference has already been made to the question of the correlation of nerve to other physiological and even physical forces; but the present state of our knowledge of this subject scarcely justifies more than an allusion to its great importance. It is common, and certainly convenient, to speak of a "depression of nerve-force." Strictly speaking, however, no force can be depressed; it can only be metamorphosed into some other of the numerous forces which prevail, or are capable of prevailing, in the animal economy. A more specific definition, then, of shock is, that it is essentially a metamorphosis of nerve-force. It will, nevertheless, be convenient still to speak of the depression or impairment of nerve-force, using the expression in a general sense.

Unconsciousness, complete or incomplete, is due to the injury which acts directly on the nervous system; and the more direct the injury, the more complete will unconsciousness be. It may also be augmented, or protracted, or even produced, by enfeebled action of the heart, which fails to send arterial blood to the nerve-centres in quantities sufficient to keep up that unceasing nutrition which is essential to the continued exercise of the nerve-function.

Muscular Inaction is due chiefly to the state of the nervous system. The will, the emotions, and sensation, are all too much in abeyance to call forth a direct muscular action. Muscular contractility also requires the constant and plentiful supply of arterial blood; and, if this be altogether absent, nerve-stimulation itself is incapable of exciting contraction. In ordinary shock, there is simply diminished—it may be greatly diminished—supply of arterial blood. The complete absence of arterial blood could only occur where shock was about to terminate in death.

Impaired tonicity, and still more paralysis of the muscular system, gives rise to many symptoms, such as an inability to maintain the erect posture, the falling of the upper lid, and others; one only of which requires further consideration at

present, and that is the failure of contractility in the sphincters. It is common in text-books to find spontaneous evacuation of the fæces and retention of urine described as indications of shock, as well as of other lesions of the cerebro-spinal system. The reason of the evacuation of fæces, in the case of the rectum, and of the retention of urine, in the case of the bladder, has given rise to considerable discussion; and no interpretation of these phenomena has yet been given which is generally accepted. I have, within the last few years, in a note to an article in one of our principal journals, given an explanation which I shall repeat here, and which I cannot but regard as a correct and sufficient explanation.

Let me first observe, that spontaneous evacuation of the fæces, even in the severest cases of shock, is not a constant symptom; and, when it is not present, there is usually constipation of more or fewer days, according to the intensity of the shock and the mode of treatment adopted. In the severer forms of shock, retention of urine is invariably present. The explanation I offer, putting it as concisely as I can, is this. When the rectum is loaded, it requires more muscular power to retain than to expel its contents. When, on the contrary, the bladder is even full, more force is requisite to expel than to retain its contents. It is only when the rectum is full, that the fæces are spontaneously evacuated in shock. The vertical position of this part of the large intestine, and the dependent position and large size of its aperture, combined with the weight of the viscera above, are sufficient to permit the fæcal accumulation to pass, if the contractility of the sphincter be lost or seriously impaired. With the bladder it is quite otherwise. Here the expulsive must overcome the retentive power, in order that urine may pass; and this may be explained chiefly by the different relative disposition and strength of the muscles of retention and expulsion in the two organs, as well as by the smaller opening of the urethra, its less dependent position, and the longer and more tortuous character of the excretory canal. When the bladder is distended to its utmost, assuming that muscular

contractility is not recovered, the urethra itself is gradually opened and distended; and thus, quite from mechanical causes, the urine commences to dribble away. The urine also continues to dribble away, at least as much as is secreted in excess of the capacity of the bladder when fully distended. It is not correct, as Sir Henry Thompson has pointed out, to call this condition incontinence; it is really "overflow"—the *engorgement* of the French.

The Action of the Heart in Shock.

No principle in physiology is more certain than that the heart's action is not necessarily dependent on the influence of centrifugal nerve-force, as proved by the fact that the heart beats in the fœtus before the nerve-centres are developed, by the existence of anencephaloid monsters, by experiments on animals consisting in the careful and gradual removal of the cerebro-spinal system, and by the contraction of the heart when removed from the body. At the same time, a principle of equal importance is this—that the action of the heart is susceptible of great modification, and even arrest, by means of influences conveyed through the nervous system. Its movements are regulated through the medium of the pneumo-gastric, spinal, and sympathetic nerves; and the researches of eminent physiologists justify the conclusion that shock may be communicated to it through either the cerebro-spinal or sympathetic systems. The physiological action of the pneumo-gastric seems to be, most singularly, to retard or inhibit cardiac action, and thus to oppose the influence of the ganglionic and spinal nerve-stimuli. Experiment shows that the sympathetic stimulates the heart to increased action; while interrupted galvanic currents along the pneumogastric nerve, as Weber showed, arrest the heart's action. The bearing of the latter fact on death from blows on the epigastrium I have already referred to. The effects of shock may be conveyed through the medium of the cerebro-spinal system to the sympathetic, and also through the sympathetic to the cerebro-spinal.

I have already stated that the action of the heart in pure shock is retarded, the number of beats per minute being

diminished. There is good reason to consider that the accelerated action of the heart, which is commonly regarded as a symptom of shock, is really a sign of reaction, however early it may set in; and reaction is properly recognised by the increasing acceleration of the heart's action—the degree of reaction also corresponding to the degree of accelerated cardiac contraction. It is quite true that reaction may commence in the heart, and yet be long delayed in its other manifestations. For a longer or shorter time, the contractions of the heart, although increased in frequency, are insufficient fully to supply the nervous centres. Here, however, I am chiefly desirous of drawing attention to the slowness of the pulse as the immediate result of a severe accident. I ascertained this in the following cases, in which I made a special examination of the heart's action: a case where the upper extremity was greatly lacerated, and torn off at the shoulder-joint; three cases in which the lower limb, including the knee, was crushed so as to require amputation; one case where the leg was crushed by the passage over it of a railway truck; twenty-six cases of strangulated hernia; nine cases of concussion of the brain, with unconsciousness (in the latter two classes of cases, the slower action of the heart is unusually prolonged); in five cases of fracture of the skull; and in two cases of severe injury to the abdomen. Sooner or later—in some cases remarkably soon, in others not for hours or days—the pulse gradually succeeds in the attempt to compensate for its weakness by increase of action.

In operations for inflammatory disease, or for injury of some duration, the pulse being already accelerated, the diminished frequency of the pulse is only relative, and may be very slight and of brief duration; but the greater and more sudden the shock, the more marked will it be. Where degeneration or other pathological change has taken place in the muscular structure of the heart, the influence of shock is much more intense in proportion to the severity of the injury, and is also much more frequently fatal.

I may mention here another sign of reaction, which is not infrequently described as one of the phenomena of shock;

namely, vomiting. I have never known vomiting to occur (except in strangulated hernia, when the vomiting has a mechanical cause), unless the pulse was accelerated, and some heat of the skin was present. And yet vomiting may unquestionably occur at an early period after shock.

Effects of Diminished Circulation.

The effects of enfeebled circulation are numerous and palpable; as, for instance, the tallowy pallor of the skin; the peculiar whiteness of the lips (which is probably due to the absence of the rete Malpighii, with its pigmentary cells, in mucous membrane); the coldness, subjective and objective; the want of lustre in the conjunctiva of the cornea and sclerotic; the contraction of the features; and the dilated character of the nostrils. The shallow, irregular nature of the respiratory action is also due in part to the impaired muscular power of the heart, but in part also to the direct influence which is exerted upon the respiratory functions, as well as upon the circulatory, through the medium of the nervous system. An important feature of the respiration is its extreme irregularity, especially in the deeper inspirations, which occur naturally, about every fifth inspiration. But the chief peculiarity in the respiration is the loss of the relative proportion in the frequency of the pulse and the respiratory acts. A glance at the cases, tabulated for the purpose of showing the relation of the temperature of the body to shock, shows this very clearly. The pulse may even increase in frequency; and the respiratory acts become slower at the same time, or the reverse may occur. This peculiarity runs more or less conspicuously through the fever of reaction, affording another point of difference between the fever of reaction and the ordinary "medical fevers."

The cold "clammy" perspiration so often perceptible on the skin is mostly found in those cases where psychical causes have played an important part in the production of shock, and in cases where the injury has occurred to a person engaged in bodily exertion. It is improbable that the perspiration is secreted at the time the system is suffering

from shock, because of the diminished circulation in the perspiratory glands, and the diminished activity of secreting cells generally, which accompany that condition. It is most likely due to the relaxation of the orifices of the ducts from diminished vascular supply and the impaired contractility of the smooth muscular fibres of the skin, which permit the perspiratory fluid to escape upon the surface of the skin. Such perspiration is never abundant or persistent in its appearance.

The blueness of the nose and fingers in cases of shock, and especially in that peculiar form of shock which results from the application of cold to all the structures, is for the first time satisfactorily explained by the experiments of my colleague, Dr. Norris, as described in his paper on "Stasis," which appears in a recent volume of the *Transactions* of the Royal Society. He has observed that, in experiments in which spasmodic contraction of the smaller arteries took place, there was a *reverse* current into the capillaries from the veins, which continued until the capillaries were full. The capillaries remained full permanently, or until the relaxation of the artery again permitted arterial blood to be propelled through it. When cold is applied to the surface, the arteries are contracted by its influence; and the capillaries are filled with venous blood which is returned from the veins. It is the presence of venous blood in the capillaries which gives rise to the blue appearance referred to. There is no doubt that the colour of the skin, whatever it may be as regards the different shades of pallor, redness, and blueness, is due to the condition of the capillaries mainly, and very slightly to the condition of the larger vascular trunks.

REACTION FROM SHOCK.

REACTION is a condition following those cases of shock which do not prove quickly or immediately fatal, and has many and varying characters as regards its phenomena and the time at which they make their appearance. When the injury and the resulting shock are slight, the reaction

follows quickly, and consists of little more than a return to the natural, or a near approximation to the natural, state of the several organs and their functions. In these cases, there is commonly some acceleration of the heart's action, some flush of the skin, and some diminution in the distinctness and vigour of the mental power. In other cases of slight injury, but considerable shock, there may be smart febrile reaction. Every one is familiar with the sensation of shock from sudden mental emotion, as in witnessing some great danger or accident to human life—the momentary confusion of thought and feebleness of the heart's action, followed immediately, so rapid is reaction in these cases, by palpitation, hot skin, and perspiration. The act of blushing is probably rapid reaction from mental shock more or less severe. Our knowledge of the fever, its nature, and the time of its accession and duration, which follows severe mental shock, is very imperfect; but we cannot doubt that, as in shock, there is some physical change in the nervous and other structures (although much of the change in nervous structures, but certainly not all, may be of a dynamical character), so in reaction there is also some further change in the affected parts of the organisation which, in favourable cases, terminates in a state of health.

In more marked shock, but not that of the severest injuries, the fever is very obvious. The pulse and respiration are accelerated, the skin is hot, the secretions are scanty and deficient in water ; thirst and headache are also present. Vomiting* occurs at an early period in reaction. In such cases, the fever of reaction comes on quickly, and as a rule, quickly subsides.

In the severest injuries, which are yet not fatal, there are two classes of reaction from shock. First, those where the fever is long deferred, or slightly marked, or too transient, and where exhaustion and a fatal termination are very likely to ensue. In the other class, reaction comes on within a few hours, speedily becomes very marked in its

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* I have often seen a desire on the part of surgeons to attribute, very unjustly, the vomiting of reaction to the influence of anæsthetics.

phenomena. The frequency of the cardiac and respiratory actions is extreme. Thirst and the other phenomena of fever are all present in an exaggerated degree. Vomiting may occur, or delirium, or a too acute sensitiveness of the special senses. The thermometer placed in the axilla will rise to 103° or 104° (Fahr.) If a trace be taken of the pulse by means of the sphygmograph, the line of descent will be more or less concave, and the dicrotism especially marked. In the majority of cases, these apparently alarming symptoms gradually subside, and the case progresses to a favourable termination. In the severer cases, the fever is probably dependent, partly on the local injury and subsequent local inflammation, and also, it may be, dependent on the blood itself, which has been altered by shock, and as is now commonly believed to the entrance of septic agents, where the shock and reaction are attended with an open wound.

Reaction occasionally increases the effect of the prior injury by inducing extravasation of blood from vessels which did not bleed so long as shock only was present. This result is mostly seen, and, unfortunately, is most disastrous, in injuries of the head. When the middle meningeal artery is torn in fracture of the skull, hæmorrhage comes on with reaction to so great an extent as to constitute, from the pressure of the clot, a frequent cause of death.*

Modes of Death in Shock.

The great majority of cases of death from shock may be attributed to syncope and asthenia. Of deaths from syncope, there are two kinds. In one, there is a sudden and extreme spasmodic contraction of the heart, which leaves it empty or nearly empty, and which is not followed by relaxation. These cases appear to result from a sudden and violent impression on the nervous system. The subject of such a form of shock is pale, unconscious, muscularly powerless, and dead in a moment, and almost simultaneously. Very much more frequently, the cause of fatal syncope is the sudden cessation

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* For this condition, when in progress, and permitting diagnosis, as it often does, I have elsewhere proposed to ligature the common carotid.

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of the contractility of the muscular fibre of the heart. Death occurs in this manner, in most cases of syncope, from the several varieties of injury or from loss of blood. It may be sudden (the first variety of syncope is invariably sudden) or gradual, as in by far the greater number of injuries where, when death is not immediate, it is often said to be by asthenia. The cavities of the heart contain more or less blood, but not firmly coagulated.

In shock, the result of severe injury to the nerve-centres or to the peripheral nervous expansion, death is mainly due to influences transmitted to the heart; but it must not be overlooked that similar influences act directly upon, and enfeeble or arrest, the respiratory function.

There is a mode of death from shock following exposure to cold, which not only differs from all other modes of death from shock, but differs from all other modes of death from any cause whatever. When the influence of cold is sudden and severe, the result is coma; but it is much more frequently the case that death occurs from shock, the result of exposure to gradually increasing cold, which acts on all the organs and tissues, and depresses directly the vitality of all. A man was brought into hospital who had been exposed to cold the whole night. There was universal but peculiar bluish pallor, with blueness of the nose, ears, and extremities. There was complete unconsciousness and inactivity of the muscular power. The heart's action was scarcely perceptible and very slow, and there was no pulsation in the extremities. The breathing, too, unlike the breathing of coma, and irregular sighing respiration of shock through the medium of the nervous system, was regular, but extremely feeble and slow. In such a case as this, it is not the nervous system which secondarily affects the heart, nor the heart which affects the nervous, respiratory, and other organs, but all by the same agency are equally reduced to torpor, inaction, and, unless timely treatment be resorted to, death.

It is a singular feature of death from violent impressions on the nervous system, that somatic death, or the cessation of circulation and respiration, is simultaneous with molecular

death. Thus, while in death from other causes molecular death is delayed for some time, as indicated by the contractility of the muscular tissue on the application of the electric stimulus, in death from shock, acting through the medium of the nervous system, the irritability of the muscular fibre ceases with the cessation of the circulation and respiration, and the chemical forces at once assume that activity which, in other cases, comes into operation at a later period. This peculiar simultaneity of somatic and molecular death, and the more rapid accession of decomposition, illustrate most forcibly the potent effects of violent impressions on the nervous apparatus.

The Pathological Appearances in cases of Death from Shock.

Those which are obvious to the unassisted eye, may be due to the injury which preceded the shock, or possibly to the shock itself—in many cases we cannot tell which. Of the changes which occur in the intimate structure of the nervous apparatus, we have no certain knowledge, and consequently not infrequently in cases of death, especially from the operation of psychical causes, no lesion can be detected after death. It by no means follows, with our imperfect means of observation and research, that we are justified in concluding that no change has taken place. It has been affirmed, and it is difficult to see how any other opinion can be entertained, that there is no kind of death which leaves the animal organisation unchanged. I have already had occasion to refer to this subject. I may add, however, that the effects usually attributed to shock which are detectable demonstrate how powerful the effects of shock may be. A current of electricity passed through an egg in process of development ruptures the vessels in the vascular area. A similar current passed through a snail coagulates its albumen. We have experimental proof that violent impressions conveyed through the medium of the nervous apparatus give rise to chemical change; and it cannot be doubted that less violent impressions give rise to pro-

portionally less marked change. The character of the force
of which a given material substratum is the medium, is most
directly and absolutely determined by the physical condition of
such substratum. When the manifestation of force is similar
to any given prior force, the character of the material instru-
ment is also similar; if the manifestation of force be changed,
there is also undoubted change in the material substratum.
An exposition of the nature of such changes in the nervous
system belongs to the future—if, indeed, it ever be possible.

TREATMENT.

THE treatment of shock varies with the degree of its in-
tensity and the nature of the prior injury. It should, in all
cases and at all times, be of a kind to assist the natural
forces of repair as far as we know how. In the slighter cases
of shock, a negative policy is the wisest—giving the natural
powers of repair all the conditions of ease and of mental and
bodily rest, which conditions should be continued for some
time after the indications of shock have passed away. In
cases of severe shock, in addition to the measures adopted
for slighter cases, it will probably be desirable to administer
stimulants in moderate amount, and apply external warmth.
Sinking is often, especially after operations, greatly relieved
by nourishment, as well as by stimulants. It is often recom-
mended to give stimulants sparingly, because of their aug-
mentation of the ensuing reaction. This caution is highly
needful, but it may be, and often is, carried too far. Stimu-
lants only to a limited degree influence reaction. In direct
injuries to the head, stimulants should undoubtedly be given
with greater than usual caution, and opiates with extreme care.
A little opium, however, added to the stimulant has a most
favourable influence in most cases of shock. In cases of ex-
tremely severe shock, it is often difficult to succeed in giving
brandy or opium with effect. My experience of cases of great
exhaustion has impressed me with this practical conclusion:
that, where brandy and opium have their natural effect, the
case, so far as shock is concerned, promises well. Where the
stomach rejects brandy and opium, it is desirable to introduce

them, with beef-tea or other nutritive fluid, into the rectum. I believe collapse to be a condition completely under control, when the subject of it can be made tipsy with brandy or sleepy with opium. If these conclusions are correct, their influence on prognosis is obvious. In the gravest cases of shock, these remedies appear to have no influence whatever. External heat is always of the greatest service (in cases of shock from cold, heat should be very gradually applied, friction and cold being the earliest remedies) and is conveniently supplied by hot water-bottles, not to the feet only, but to many parts of the body.

It is in the severest cases of shock—those, namely, in which shock itself threatens a fatal result—that the greatest promptitude and care are required in the treatment. I have no hesitation in saying, on grounds of experience, of philosophical deduction, and of physiological experiment, that by far the most important remedy is immediate and extreme external heat. Death in such cases occurs from cold, and there is no time to wait; indeed, it may be impossible to secure the generation of internal heat by means of brandy. External heat, where it is practicable, as in hospitals, where the majority of these cases are treated, is best supplied by the hot-air bath. Chossat's experiments on pigeons are pertinent to this question. In pigeons that were on the point of death from starvation (in which cases death is also from cold) the muscular and nervous functions being completely in abeyance —a condition very little removed from death itself being present—manifestations of comparatively active muscular power were obtained by placing the pigeons in a heated atmosphere.* In addition to the external heat, brandy, opium, hot milk, beef-tea, and other nutritious fluids, will be desirable, either by the stomach or by the rectum. If any coma be present, opium should not be given; neither should it be given in slight shock; nor in direct injuries to the head, except strongly indicated by restlessness, sleeplessness, and delirium.

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* This paragraph was written and printed sixteen years ago, and further experience confirms me in its teaching. Quickly obtained extreme heat is beyond all other measures *the* treatment for shock.

Where there is reason to fear that respiration is about to cease, and the injury is not of a necessarily fatal character, artificial respiration may be desirable, although, in most cases, external heat (which in these cases is possibly interchangeable with nerve-force) will answer better. In cases where death threatens from loss of blood, transfusion offers a chance of recovery, which, when it is practicable, should not be neglected. In all cases of shock, and in every operation where it is possible, the recumbent posture should be preferred to any other, and should be maintained until all fear of failure of the heart's action has passed away.

Can anything be done when the circulation has actually ceased? There is now no doubt that it is quite possible for the heart to resume its action after complete cessation of all movement. How to secure a return of action is a question of almost oppressive responsibility on the part of the surgeon.

From facts which have been observed in animals, it has been inferred that opening the external jugular vein, when it is found turgid, would enable the heart to act more vigorously. In experiments on animals, is it not the *puncture* itself which stimulates the heart to action, rather than the escape of blood from any given cavity?

I have not observed in the human being the turgid condition of the jugular veins referred to; and *post mortem* examination in cases of fatal shock reveals only a moderate quantity of blood in the heart. Where the heart has actually ceased to beat, I believe that experiments on animals that have certainly been resuscitated in this way indicate the possibility of restoring the cardiac action by means of a rapid puncture of the heart with a long sharp needle.

The Treatment of Reaction, like that of shock, is rather of a negative than a positive character. To watch and assist nature is our chief duty. Some diminution of diet, some purgation, and plentiful supply of bland fluids to satisfy thirst, may be necessary. Under ordinary circumstances, so far as shock and reaction only are concerned, it can rarely if ever, be necessary to bleed. In wounds of the thorax,

and on grounds other than those of shock and reaction, it is a controverted point, whether bleeding shall be resorted to or not.

THE PREVENTION OF SHOCK.

It is the duty of the surgeon, as far as he possibly can, to prevent shock. It is probable that, in some degree at least, and certainly so far as the psychical causes of shock operate, anæsthesia answers this purpose in surgical operations. As regards the administration of anæsthetics in operations, during the existence of shock, considerable difference of opinion prevails. Thus an excellent observer, Mr. Lister, advises it in such cases, and remarks that the circulation becomes stronger under the influence of chloroform. A sphygmographic trace, taken under chloroform in one of the cited cases, suggests this view. Mr. Savory considers chloroform inadmissible, and observes that it is the less necessary because the subjects of severe shock feel little pain from the subsequent operation. My practice has been to administer an anæsthetic, and less suffices in these than in ordinary cases; and I think that the practice has decided advantages.

On so important a question as the effect of anæsthesia in warding off shock, I determined to ascertain what information might be afforded by experiment. At my request, the two following experiments were performed by Dr. Norris. The first experiment was designed to show the effects of a given injury under the influence of chloroform, and the second to show the effects of a similar injury without an anæsthetic. I give them in the words of Dr. Norris, written (as in the previous experiments I have brought forward) at the time.

" Etherised a frog. Observed that the heart still continued to beat forcibly, and to raise sensibly the parietes of the chest. Placed the webs under the microscope, and found the circulation proceeding vigorously throughout the capillaries. The head was now crushed by a blow from a hammer. Examined the webs within a few seconds, and found that

the circulation had been arrested; a little sluggish move-
ment in some of the supplying arteries. No apparent
movement of blood in the capillaries. At the moment the
head was crushed, not the slightest motion, either of a
convulsive or tremulous character, occurred in the limbs.
This indicates that the anæsthesia of the nervous system was
complete. Twenty-four minutes after the operation, slow
movements of the blood-corpuscles were still observable in the
arteries. In one of the arteries I observed a to-and-fro
motion of certain groups of corpuscles. These movements I
attributed to irregular contractions of the vascular coats;
but to make sure that the heart had no part in their
production, I removed the skin from the parietes of the chest;
but, on careful and prolonged examination, could not detect
the slightest cardiac impulse. I then completely exposed
the heart; and, although quite quiet at first, it soon com-
menced (as usual on exposure) to beat at irregular intervals,
and continued to do so for about an hour. It is clear,
therefore, that the action of the heart was arrested by the
injury suddenly done to the nervous system."

In the following experiment, no ether or chloroform was
used.

" A vigorous frog was taken, and the webs examined
microscopically. The circulation was proceeding in a normal
manner. The head was now, at 9.38 A.M., completely
crushed with a hammer. In a second or two, the webs
were again examined, and the arteries and capillaries were
already exsanguine. A little movement of corpuscles in the
veins was still observable. Two minutes having elapsed
since the injury, scarcely a perceptible movement could be
detected in the webs; the veins have also become pale and
indistinct. On the whole, I am struck with the general
exsanguine appearance of the webs, which seems more
marked than in the cases in which chloroform was used.
No reflex movements could be induced by irritating the
periphery. 10.30. Slight movements occasionally occur in
the veins. No return of reflex power."

The difference in the result of the two experiments just

cited is not very great or very definite; but what difference there is, is distinctly in favour of the beneficial influence of anæsthesia. If these experiments proved merely that anæsthesia was not absolutely injurious, their importance would not be slight; and to the advantage, whatever its importance may be, which the experiments enable us to infer, we have to add the almost incalculable advantage, which anæsthesia affords, of protection from the operation of psychical causes of shock in surgical operations. But I believe that anæsthesia is not only not injurious: it is positively advantageous in diminishing shock, not merely in preventing mental influences, but also in maintaining the vital powers. The patient who has been operated upon under the influence of anæsthesia is less the subject of shock than a similar patient, under similar circumstances, upon whom an operation has been performed without its aid.

One of the conclusions I have arrived at in investigating the nature of shock is, if it be accepted as proven, of great importance in the prevention of shock after certain operations. Shock is most severe where the higher nerve functions are most active—such is the conclusion which observation and experiment lead me to believe. If so, can we contrive to diminish the activity of nerve force for a time prior to those operations which are not of urgent character as regards time. Before lithotomy in the adult, before all operations for conditions which have not interfered with the active use of the brain, may we in any way lessen the activity of the intellect and will. Complete rest in bed for many days, the absence of all business or professional occupation, a somewhat restricted diet, perhaps mild purgation, naturally suggest themselves. Can anything more be done before a grave and exhausting operation? Could some kind of mild stupor or drowsiness be induced by opium, or alcohol, or slight but protracted inhalations of ether? We know that amputation of thigh in a nervous system long depressed and worn out by disease of the knee joint is greatly more favourable than the amputation of the thigh of a man in the moment of active intellectual life. Can we induce or

imitate this worn out system? I once assisted a friend to amputate the thigh of a man in active medical practice who was the subject of long standing epitheliomatous cancer. Repeated excision had failed to entirely remove it, and yet he was able to attend to practice. To my inexpressible astonishment the man whose thigh was to be cut off within an hour, himself drove to the station to meet me. He insisted on making a box of pills five minutes before the anæsthetic was given. On a beautiful country hill-side he died, I learnt, apparently from septic conditions which were probably in a great degree due to shock—shock which he did his best to aggravate. Had he been asleep, or anæsthetised, or even drunk for a week before the operation, he would have had a better chance. A gentleman in very active business and public life was brought to me, by his family medical attendant, with a large stone in the bladder. A day was fixed for lithotomy, and instructions given for a preliminary period of complete rest. He discarded all advice. He sat on the magisterial bench on Saturday, and performed other public duties to the close of the day. He had not spoken about his ailment, or the operation, to a single friend. On Sunday morning I performed lithotomy by the lateral method. The shock immediately following the operation was not unusually severe, but it was prolonged, and characterised by exacerbations. A week after, curious cerebral symptoms— partial unconsciousness, with muscular movements of the head and neck, not actually convulsive—appeared, attended with obstinate sleeplessness, which opium and chloral failed to relieve. The weather at the time was intensely hot, and something like heat-stroke was believed to be present. During this attack creeping cellular inflammation attacked the wound, and led to an indirect communication with the rectum, which became the cause of much distress. If I repeated the operation to-morrow, or twenty times over, keeping to the lateral method, I could not devise a single alteration or improvement in any one step. I believe all these anomalous symptoms arose from the fact that the man's nervous system was kept at the highest tension up

to the moment of the operation. Here again a week in bed with drowsiness or partial anæsthesia would have been a better protection against the accidents which are directly or indirectly connected with shock.

In conclusion I venture to repeat a few salient facts connected with shock, which appear to me to have great importance. Shock is attended with a diminution of nerve force, and the amount of shock may be estimated by the amount and kind of diminution of nerve force. Shock is a measurable quantity. All nerve functions may be placed under the following heads. I state them in the order of their importance—volition, ideation, emotion, sensation, and motion. One degree of shock, mental or bodily in its cause, will paralyse the will; a severer degree will suspend the ideas; another destroy the emotions. It is when they impair sensori-motor and reflex actions that they interfere with those nerve functions which are absolutely essential to life.

Shock is always most marked where nerve function is highest in character and most intense in action. The maximum of shock is in the adult man, whose will and ideas predominate over all other functions. The minimum of shock is in the very young, the feeble, and the old, whose nerve forces are blunted or converted into some other forces. I have elsewhere given this as the explanation of well-known facts. An adult man has his knee crushed. Amputation in the thigh is needed. He dies. Another man, long bed-ridden, and worn out with the pain and discharge of old knee disease, requires amputation of the thigh. He lives. The lower the nerve force the less the shock. Before birth a fœtus may have every limb amputated; and live. Not so after birth. A hybernating animal can scarcely be killed. The nervous skilled artisans of towns bear shock worse than the more blunted nerves of workers in mines and fields—a fact which hospital statisticians usually note.

As regards the prevention of shock.—If I were going to have my thigh amputated, without the protection of long disease, I would ask that ether should be given to me

many hours before the operation, that I might thereby approximate as nearly as possible to early infancy, the stupidity of prolonged disease, or the hybernation of animals. The best protection against shock is a state similar to shock, namely anæsthesia to the extent of sleep for many hours. Dr. Wilks has said that a blow on the head by an expert is as serviceable as chloral. I can only express my belief that a dexterous blow on the head before amputation of the thigh would give much better results than amputation of the thigh during the vigorous exercise of volition and ideation.

With regard to treatment.—When the profound forms of shock are before us I believe that extreme external heat may be most readily converted into or take the place of nerve force. Chossat placed pigeons that were apparently dead from starvation (a kind of shock) in a chamber of hot · air. They were soon able to stand, and shortly seemed to have apparently little the matter with them. When restored to an ordinary temperature (the cool air so much the rage with ventilationists just now) they died in a few minutes.

The most formidable variety of shock we have to deal with is relapsing shock. After an operation or injury followed by feeble reaction, shock again appears—for the most part an indication of visceral complications. I often feel grieved to think that in cases where surgery is powerful to save, our patients die from structurally diseased kidneys, liver, heart, or lungs.

THE
TREATMENT OF SURGICAL INFLAMMATIONS.

INTRODUCTORY. FREQUENCY OF SURGICAL INFLAMMATION.
THE INFLAMMATORY PROCESS THE SAME IN ALL ITS MANIFESTATIONS.
VARIETIES OF TREATMENT. SHOULD BE ONE METHOD.

It is a remarkable circumstance that although the number of inflammatory diseases outnumber all others put together, the treatment of inflammation is characterised by uncertain opinions and multitudinous remedies. In this enquiry it will be contended that the inflammatory process is, in the main, one and the same process, however various its localities, complications, stages, and results. But, if there be one process, there ought to be one clear line of treatment. I believe experience and reason alike show that a group of measures may with advantage be used in all cases.

It may be said, once for all, that inflammation, generally, is spoken of here. There are inflammations, not only of a specific character, but inflammation in which the specific element is usually paramount. In syphilitic inflammation the syphilitic factor is more important and needs to be treated with more directness than the inflammatory factor. It is so also with the rheumatic and gouty, and some other inflammations. Specific inflammations will not now be spoken of, although it would be well to remember that when the inflammatory action, as such, becomes a predominating feature, the remedies best adapted for removing simple inflammation may be added to those which are intended to combat the specific element. Neither is it intended to speak of the accidents or complications of inflammations which for special reasons require operative or local relief. When inflammation of the air passages threatens life from suffocation, air must be let in by operative methods. When inflammation is due to mechanical conditions these must clearly be removed.

The cystitis of calculus, or stricture, or enlarged prostate, must be met by removal of the cause, if possible. It is unnecessary to stop here and tell the surgeon what complications and mechanical conditions demand the first attention. The treatment here discussed is that of the inflammatory process itself in its numerous phases.

The great majority of diseases which the surgeon treats are of an inflammatory character. They form a large proportion of any surgical nomenclature, they form a still larger proportion of the cases in actual practice. If we look at the diseases of the cutaneous structures, we find that the frequency of cancer, nævus, and warts, is slight, contrasted with the frequency of abscess, boil, carbuncle, onychia, paronchia, erysipelas, and the ulcers. In the bones, again, periostitis, acute and chronic, osteitis, necrosis, caries, abscess, sclerosis, preponderate numerically over rickets, mollities, tumours, and cancer. It is so, more or less, with all the organs, the diseases of which fall to the lot of the surgeon to treat.

I have taken some pains to ascertain the percentage of inflammatory and non-inflammatory diseases in the out and in-patients of the Queen's Hospital, between two fixed dates. In round numbers, of the out-patients five-sixths of the diseases were inflammatory, of the in-patients two-thirds were inflammatory. The disparity is probably due to the entrance into hospital of cases specially for operations, as cancers, various tumours, herniæ and vesical calculi.

Excluding for the present specific inflammations, as the syphilitic and rheumatic, no one contends that the inflammatory action is a different process in the different localities, organs, and tissues. How comes it, then, that there are numberless varieties of treatment for inflammatory diseases? How comes it that there is one list of treatments (if I may say so for brevity) for an inflamed urethra, another list of treatments for inflamed prostate, another for inflamed bladder, another for inflamed testis, one for inflamed tongue, another for inflamed tonsils, another for inflamed larynx, another for inflamed bronchus? In systems of surgery the chapter on

the treatment of inflammation gives a long list of remedies. In the subsequent chapters these are frequently forgotten and new ones are introduced.

Inflammation then being in the main *one* disease why should we not have in the main *one* treatment. Let us consider for a few moments some example of a simple inflammation—say an inflamed patellar bursa, cured at a moderately early stage, before new tissue or chronic thickening has appeared. No drug or combination of drugs will cure it. Rest alone will not cure it. It may be certainly cured by means of counter-irritation in the form of cantharides, or iodine, or even by mustard. Take another case. A man came with severe double acute orchitis and unable to stand upright. Counter-irritation, slightly to the scrotum, and sharply over the upper thirds of both thighs, and lying in bed practically cured him in twenty-four hours. No drugs or other remedies could have done this. Seeing that counter-irritation can do what no other remedy can do in certain manifestations of a process which is the same process in all its numerous manifestations, why not use counter-irritation in all? Why not use it in abscess, carbuncle, cellulitis, erysipelas, osteitis, periostitis, synovitis, urethritis, and so on? If the bursal inflammation or synovial membrane be also submitted to gentle compression, especially when the inflammation has proceeded to thickening, the subsidence of the inflammatory action will be much quickened. Here there is another remedy which can do what no drug, or combination of drugs can do. Why not use pressure— gentle, or moderate, or firm, as circumstances require, in all inflammations where it can be used? Why not adopt these remedies to the age, the locality, and the severity?

THE PRINCIPLES WHICH SHOULD GOVERN THE TREATMENT OF INFLAMMATION.

The real nature of the inflammatory process is still a matter of dispute. Fortunately, the signs of its presence are usually clear. The process is attended by certain phenomena which are so regular and uniform that they may be

said to be conditions which are essential to its existence. Some of these conditions can be more or less removed; the difficulty of removing them completely is the practical difficulty in the treatment of inflammation. We do not know exactly what life is, but we know the conditions under which it exists; we know that the removal of any one really essential condition, as air or warmth, or food, will put an end to life.

What are the principal conditions which are needed for the prosperous beginning and progress of an inflammation? An inflamed part must have room to swell in, it must have more blood, it must have no rest, it must not be near any other inflammation. Inflammatory action, whatever its nature may be, needs more space. If it were possible to keep any part of the body within its physiological precincts, it could not inflame. Mechanical pressure it is true, is but a rude method of restoring an inflamed part to the area of health, but clinical experience as well as pathological reasoning clearly attest its value.

Another essential condition of inflammation is increased quantity of blood or "ministering" fluid. No part of the body can be inflamed if the "health quantity" only of blood be present. Local diminution (*general* loss of blood means loss of repairing power) can be effected by pressure and elevation where practicable, and especially by exciting a *second* inflammation over another, say the next vascular territory. Some local depletions and pressure upon or occlusion of the feeding artery act on the same principle.

A condition which keeps up and aggravates inflammatory action is *unrest*. Movement is as mischievous to an inflamed microscopic tissue element as it is to an inflamed joint or eye. Rest is a remedy so necessary as a foundation to all other treatment, that it can only be regarded as an evidence of the slow progress of therapeutics that it should have been left to a surgeon of the nineteenth century (Mr. Hilton) to enforce its universal need.

At the risk of some repetition, I venture to give a summary here which I have given before. " Before looking

at the means which will best remove an inflammation, let us look at the circumstances which will make it worse. If a part be inflamed, give it plenty to do—small print to read for an inflamed eye, long walks for an inflamed joint and so on. See that the inflamed part has plenty of blood; keep it hot, and the rest of the body and the surrounding air cold. Especially see that no second inflammation interferes with the prosperity of the first. Give the inflamed spot abundant space and free opportunity to swell, and let its vessels gorge to their utmost dimensions. Let the inflamed part hang well down, and add to the general discomfort by introducing a splendid combination of drugs into the stomach. To adopt the exact and extreme opposite of all these means is, I think, the best way to cure inflammation. Complete rest is not so much a remedy as the essential foundation of all other remedies. A second and a smart inflammation in an adjacent patch of skin, over an independent vascular region, will vigorously divert the blood stream from the primary inflammation and develop a new outlet for pathological force. The more vigorous a second and separate and safe inflammation, the less vigorous the first and more dangerous inflammation. Counter-irritation is also the best reliever of pain. Active elevation and suitable pressure are important aids in the treatment of inflammation. A diluted solution of iron internally, and a mild, unstimulating diet, are not unimportant."

THE REMEDIES FOR INFLAMMATION. THEIR SELECTION.

The true basis for the selection of remedies is, of course, success. Further, if the remedies which are known to be best in some, not specific, inflammations are not in practice also the best in all, the object of this enquiry entirely fails. But if, reasoning on physiological and pathological grounds, we infer that certain remedies *ought* to be the best, and it is found that they are the same as those which are, *in fact*, also most successful, our trust in them is greatly strengthened. It is urged here that counter-irritation, gentle compression, elevation and rest, are the remedies

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which reason and experience point to as the most trustworthy
remedies; it is more especially urged that the best remedies
for inflammation, whatever they are, should be used in all
inflammations.

Counter-irritation is a term which has excited much dis-
cussion. The word itself is impeached. It is no part of
this enquiry to consider the accuracy of the word, or even
the way in which counter-irritation acts. These facts
simply will be used, that two inflammations do not flourish
together. That over and over again a patch of inflamed
skin has removed adjacent inflammations which no drug
could touch. I have repeatedly known in my own person
a smart, early, catarrhal bronchitis, relieved in sixty minutes
by the application of a large mustard plaster. I have
several times seen an acute synovitis of the knee completely
disappear in twenty-four hours after the application of a strong
solution of nitrate of silver. I have frequently seen an
acute orchitis entirely relieved in twenty-four hours after
counter-irritation to scrotum and thigh. These are the most
rapid cases of the cure of inflammatory disease that I know.
Drugs can do nothing in such inflammations; can they
in any do more than obtain some collateral and less direct
benefit? In the synovial cases the nitrate of silver did not
draw the fluid out of the joint into vesicles on the surface,
because there were no vesicles. A few years ago an
eminent physician, who derided the utility of counter-
irritation, advanced the extraordinary view, that when a blister
cures a synovial effusion, the fluid itself passes through all
the tissues and myriad capillaries, with their swift currents
of blood, into the cutaneous vesicles, still remaining synovial
fluid.

Illustrations of the powerful effects of diversion of the
blood current are numerous both in physiology and path-
ology. With active brain work digestion flags; with disturbed
digestion brain action flags. All the symptoms of a severe
cold (tears, and nasal discharge, &c.,) will vanish for a
time in a person who makes a speech or gives a lecture.
Purgatives relieve cerebral symptoms, because they take

blood to the intestinal canal. An acute orchitis arrests gonorrhœa. A carbuncle, an experienced observer tells me, at the back of the neck, will cure an obstinate ocular inflammation when all remedies have failed. When this action is better explained, and a better designation offered, the explanation and the term will both be welcome.

Seeing that counter-irritation in some inflammations is so rapidly beneficial, I have often asked myself why it is not more frequently used. Counter-irritation as often used is simply direct irritation. It is possibly so in pleurisy, especially in the early stage. The same may be said of the abdomen, the cranium, of thinly covered bubo or joint. But counter-irritation over another, more or less independent vascular territory, tends to arrest the original inflammation, wherever it may be. I have little doubt that in the earlier stages of pleurisy, a blister covering the inner side of the arm would rapidly subdue inflammatory action. I do not refer, of course, to pleurisy, the result of tubercular or foreign-body irritation.

It is not contended that the localities for counter-irritation suggested here are the best. Future experience will probably bring improvement. The principle laid down, however, is clear and definite, and in practice has been shown to give results of an eminently striking and satisfactory character. *Counter-irritation should be established over the next, or another, or an independent vascular trunk or territory.* In intra-cranial inflammation, counter-irritation should be excited over the branches of the external carotid— over the neck generally, if a superficial irritant be used; over the mastoid process or back of the neck, or both, if a deeply acting irritant be used. In abdominal and pelvic inflammations, deep counter-irritation should be excited over the femoral arteries. In all these instances the inflammation and the counter-irritation may be reversed in locality; in inflammations of the upper extremity, or the thigh, irritation may be excited over the thorax or abdomen respectively. Although only a detail, I believe there is some advantage in putting stripes of counter-irritation over the arteries.

The arteries are in sheltered positions, larger branches, of course, lie nearer the trunk, and as the larger nerve trunks lie mostly with the arteries, the nerve influence, if any, may be increased by the locality and configuration referred to.

It will be seen already that counter-irritants may be roughly classed under two heads—the deep and the superficial. In the agents used for artificially producing inflammation there is room for much improvement, especially is this so as regards certainty, definiteness of degree, and painlessness of action. I have chiefly used iodine, nitrate of silver, and cantharides. Iodine is very convenient because it can be used in so many degrees of strength from the tincture to the strongly acting liniment, intervening degrees of strength being obtained by mixing in different degrees the weak tincture and the strong liniment. The mixture may be conveniently designated a "pigment." Strong solutions of nitrate of silver are also excellent irritants; they are apparently a little more painful than iodine. The acetum lyttæ (made with glacial acid) is an excellent application for less extensive surfaces. It is painful, but only for a very short time. Where counter-irritation requires to be maintained for a length of time and over a large surface, an iodine pigment is perhaps the most convenient agent. If the artificial inflammation of nitrate of silver or cantharides requires to be prolonged, it may be by new patches, or stripes, or circles, or the use of cantharides ointment after cantharides. Near the urinary organs arg. nit. or iodine is preferable to cantharides. In children counter-irritation should be excited with care, especially in the very young. Slighter agents over a larger surface are better than the deeper irritants. No important irritation should be excited in children without the kindly aid of a few breaths of chloroform, which with them is so safe and pleasant. In addition to the agents referred to, mustard, turpentine, hot water, and many others may be occasionally used. A warm bed, a warm room, or a good fire, are mild counter-irritants in cold or other ailments; they have killed nobody, while cold rooms and

open windows have sent hundreds and thousands to the grave.

A very simple and successful mode of effecting counter-irritation, especially where superficial irritants are used, is to adopt the form of circles, or zones, or horse-shoes, or crescents. Where a deep irritant is used the circle must be narrower.

A most striking feature of counter-irritation is its quick and certain relief of pain. It frequently happens that patients with carbuncle and other inflammations voluntarily ask for a repetition of a zone of iodine because of the previous relief to pain.

Pressure.—I have already remarked that if any given part of the body, including each individual tissue element, could be restrained within its physiological area it could not inflame. Of this fact nature herself furnishes a striking example. In so-called acute orchitis the inflammation is really in the epididymis. The inflammation travels from the urethra to the epididymis by an unbroken surface, and by the same surface might naturally be expected to enter the testis. That it should suddenly break off here, and expend itself in the adjacent connective tissue, can only be explained on the ground that there is no room within the tunica albuginea for sudden acute inflammatory action. The inflammatory process is thwarted and retarded in any part which is by construction or situation naturally subjected to pressure. Like every other important remedy it requires great care in its use. It should not give rise to pain. It should be gentle in acute and early stages of inflammation, it should be especially gentle, if used at all, where destruction of tissue is threatened, it should be firmer in chronic and the later stages of inflammation. Neither pressure, nor counter-irritation is here advanced as a nostrum that any one may use under any circumstances. On the contrary, they require judgment and experience as to the method, and the extent, and the agents which shall be used.

There is probably not a single accessible acute inflammatory disease in which some degree of pressure may not

be used. The *pressure* and the *heat* (counter-irritation) of a poultice are not only bearable but "comforting" in the acutest and tenderest inflammations. Or is there any virtue in linseed meal, independently of its being a medium for pressure and heat?

Shot-mattresses, from the lightest to the heaviest, strapping, easy or firm, bandages, slacker or tighter, are the simplest means by which pressure may be effected. A shot-mattress over, or a bandage around a poultice materially augments its benefit, even in acute inflammations. Chronic inflammatory products, say in the breast, testis, cutaneous structures, knee-joint, &c., are more rapidly and effectively dispersed by carefully adjusted pressure than by any other treatment.

Of the utility of rest, the importance of which should never be forgotten, of elevation, of the removal of any known cause, of the importance of attention to diet, and even drugs for given purposes sufficient mention has already been made.

The utility of elevation of inflamed parts is more frequently acknowledged on paper than in practice. In the limbs it is often necessary simply to relieve pain, for the tension of an inflamed foot, or leg, or hand, or fore-arm, is greatly diminished if the veins are emptied by elevation, at the same time that a barrier to local circulation is removed. In elevating the limbs care should be taken, where there is no good reason to the contrary, that the joints are somewhat flexed, as they always are when in repose.

There is one kind of elevation to which I shall draw attention here, because of its great utility, in my opinion at least. It is that of elevation of the pelvis in inflammatory diseases of the pelvic organs, by placing a flat pillow under the nates.   It is especially useful in hip disease, because, besides assisting the local circulation, it tends to overcome, by the weight of the limb itself, the tendency to flexion which is often difficult to counteract, and which, if it be allowed to remain, causes a little limp in an otherwise cured case.

The different remedies which are here believed to be best,

where it is practicable, should be used together. In many inflammations, as prostatitis, cystitis, urethritis, &c., pressure of course cannot be used. Where they can be used in combination they may require to be used in very unequal proportion; in an acute inflammation, an abscess, or an erysipelas, counter-irritation should be the principal treatment in the earlier stages and pressure in the later.

A very convenient and successful combination is that of pressure to the inflammation, and counter-irritation over the next artery. In inflammations of the mammary gland, or the testis, the inflamed organ may be compressed, and the brachial or the femoral " lines " be irritated.

It will be useful to remember that in the *group* of remedies which are here advocated, one measure will predominate in one inflammation, another measure in another. Counter-irritation may be the leading item of treatment in one case, pressure in a second, elevation in a third, rest in a fourth. But although one measure becomes paramount the others should be added. To determine the relative importance of each principle of treatment and to arrange the detailed application of each furnishes ample scope for judgment and experience.

It requires that all these remedies should be used with thoroughness and care. It is easy to carry out the treatment in a perfunctory manner, or adopt it in some case where there is some mechanical or marked specific cause for inflammation, and express disappointment with the result.

I do not wish to claim too much for the method now advocated. There are many inflammations which are really adjuncts to some irrepressible visceral disease for which treatment is of little avail. Of diathetic inflammations I have previously spoken. I contend, however, now from many years experience, that the treatment is more successful than any other. It leads to recovery often in a mere fraction of the time required by ordinary treatment. Where the treatment is long, it is, nevertheless, the shortest and best. Where it fails, as in this world every kind of treatment must, it has at least given a better chance than any other treat-

ment could have given. It cannot undo confirmed structural changes, but it can often arrest these, or reduce them to their narrowest limits. If sloughing has commenced it will, by rapidly removing the inflammation around, reduce the slough to its smallest size, and effect its rapid separation. If suppuration has occurred, it will lessen its area, disperse it, or quickly expel its products from the living body.

TREATMENT OF IMMINENT INFLAMMATIONS AND SOME NON-INFLAMMATORY DISEASES.

IT is well known that the chief danger after certain injuries and operations is inflammation. After a wound of the abdomen, or, but in much less degree, after the operation for ovariotomy, or the operations for strangulated hernia, there is danger of peritonitis. This, I believe, I have sometimes prevented and sometimes diminished by the free application of iodine to the abdomen and front of the thighs. In injuries to the joints, especially perforating wounds, which are frequently followed by destructive suppuration, does it not seem in the highest degree probable that a vigorous excitement of the tissue elements of the skin tends to lessen the excitement of the tissue elements of the wounded synovial membrane? In an injury of the head an artificial inflammation of the neck tends to divert pathological action from the intra-cranial contents.

There are a few non-inflammatory diseases in which derivation of blood by means of counter-irritation is of more or less service. In spermatorrhœa, which is frequently due to congestion of the prostatic portion of the urethra (and often from the presence of indigestion and highly acid urine), counter-irritation to the perineum and thighs I have found much more successful than any other treatment. In enlarged prostate and internal morbid growths of various kinds, a stripe of irritation over the next large artery will often relieve discomfort. As an example of the delay of inflammation from traumatic causes the following case is of interest. In merely relieving pain counter-irritation was of the greatest use.

Delayed peritonitis after rupture of the intestine: Death from shock on the seventh day.—A woman of 35, after injury to the intestine, was insensible from profound shock for six hours, with an axillary temperature of 95°. When she rallied she progressed for several days very favourably, except that she was subject to occasional pain in the abdomen of a very severe character, which changed its locality at each recurrence. *These pains were always relieved by vigorous local applications of iodine liniment around the seat of the pain and in the groins.* Opium and a little nourishment were given by the rectum only. During the seventh day she suddenly and in a few hours sank from shock. After death a rupture of the intestine was found, and a thin layer of solid fæces spread over the intestines. There was no peritonitis.

In the following case the uniform improvement which succeeded each individual application of iodine was surely something more than a succession of coincidences :—

"*Ovariotomy during peritonitis: Counter-irritation at groins: Recovery.*—Mrs. K., age 40, entered the hospital for the purpose of having ovariotomy performed. There was constant vomiting, a quickened pulse, and a temperature of 99⅖°, with abdominal tenderness. As these symptoms did not abate with time, the operation was performed. Universal recent adhesions were found. Vomiting and pain during the first few days were met chiefly by counter-irritation in the groins. Improvement uniformly followed each application. Linseed poultices to the abdomen were also sprinkled with mustard. Complete recovery followed."

In the following case, which I brought before the Medico-chirurgical Society fifteen years ago, of severe wound of the knee-joint, it is impossible to say that this case would not have done well without the counter-irritation. One circumstance, however, struck the dressers and pupils. Counter-irritation was not applied for several hours after admission. He was complaining of pain in the limb, and was very restless; when the counter-irritation was excited, both the symptoms immediately disappeared and did not return.

"*An incised and gaping wound of the knee joint: Rest,*

pressure, counter-irritation : Recovery.—A man, age 20, a currier, accidentally laid open his right knee anteriorly to the extent of two inches. The articular extremities were visible. The wound was carefully closed with silver wire, the joint was compressed with dry lint, (I should probably use a soft constantly moist antiseptic sponge now as keeping up better and adapted pressure as well as antisepticity), and a splint affixed. Counter-irritation to the thigh and leg was adopted and maintained. Not a drop of pus formed and no unfavourable symptom occurred. In six weeks he was allowed to get up."

TREATMENT OF INFLAMMATORY DISEASES NOT PECULIAR TO ANY ANATOMICAL SYSTEM.

SIMPLE LOCAL INFLAMMATION.

A SIMPLE local inflammation which has not proceeded to suppuration or ulceration is not described in surgical text books, or any reference made to its treatment. I venture, however, to draw attention to inflammation in its earlier stages as a distinct disease. If we pass from the surgical library into the surgical ward, or out-patients' room, we frequently meet with enlargements which are tender, hard, hot, and perhaps painful, and covered by red or œdematous integuments, which often subside quickly or slowly, and which are more or less influenced by treatment. Such an inflammation is not an abscess, or a carbuncle, or an erysipelas, or, in the ordinary sense of the word, a cellulitis.

Often in such cases all that we can say is that an inflammation is present. But it is also not rare to find such a combination of local phenomena as enable us to do more than this, to say, for instance, here is an incipient abscess, here an incipient carbuncle, here an incipient whitlow, here an incipient cellulitis. There is yet no pus in the abscess or whitlow, no slough in the carbuncle or cellulitis.

In the great majority of these cases it lies in our power immediately to arrest the inflammation. We can not only prevent suppuration or sloughing, but we can, sometimes

even in a few hours, rapidly remove considerable masses of induration and painful swelling. How can this be done? Chiefly by counter-irritation. A belt, or zone, or horse shoe of counter-irritation carried around, and a little distant from, the inflammation will remove it in a period of time which will depend on the extent and intensity of the new inflammation. The following cases, briefly stated, show the great benefit of counter-irritation in the vicinity of inflamed areas.

Extensive inflammation of popliteal region: Counter-irritation to thigh and leg: Rapid subsidence.—A little girl of five was brought to the Hospital with the left knee semi-flexed. A large red, hard, and very tender swelling filled the popliteal space, and encroached on the thigh and leg. Smart fever was present. The thigh and leg were painted (see diagrams) leaving only the inflamed part uncovered, and a large poultice, when the paint had dried for an hour, was ordered to envelop the knee and adjacent limb, and to be surrounded by several turns of bandage, securing pressure short of pain. In two days nearly all inflammation gone; in five days limb quite well. Not a drop of pus formed, at least no opening was formed or made.

Severe incipient whitlow: Counter-irritation: Immediate subsidence.—A woman presented a finger in which a tense shining red and painful swelling had come on for a week. Iodine paint to the *other* fingers, all the hand, and part of fore-arm. Complete relief in twenty-four hours. All symptoms gone in a few days.

It is not intended to show that it is well to dispense with the knife here, or in deep abscess, but where pain is not acute, or is relieved by counter-irritation, the knife need not be instantly resorted to. In deep, painful whitlow, the knife should be hourly in mind. This case represents a large number which I have seen. The knife, poultices, and a three week's sling, were saved as a rule.

"*Sub-acute glandular inflammation: Counter-irritation: Arrest and subsidence.*—A girl of four was ailing a few days,

when a hard oval swelling was found occupying the outer two-thirds of the groin. A horse-shoe of weak paint was applied above, externally and below, but the skin was very sensitive, and only a little was used occasionally. A poultice was applied within the horse-shoe of paint. It caused smarting. No marked changed occurred for several days, when the inflammatory mass rapidly disappeared, and the child was suddenly well and active. *Remarks.*—Such cases mostly end in abscess of three weeks to three months' duration."

"*Incipient abscess in axilla : Circumjacent counter-irritation : Immediate disappearance.*—Jno. H., age 28, labourer, had a large red, painful, and tender tumour in the axilla, of fourteen days' duration. Iodine paint was freely applied to the thorax, axillary folds, and upper arm. On the third day the swelling had disappeared, and on the seventh there was complete recovery."

THE TREATMENT OF ABSCESSES.

The treatment of abscesses is uniform and simple. If very acute, a not wide (the width must always depend on the extent of the primary inflammation) zone of integument may be painted with acetum lyttæ. The benefit will perhaps show itself in twelve or eighteen hours, but then it will be very rapid. In somewhat less acute abscess (and even in the most acute) an effectual and rapid treatment is to paint a broader zone of iodine—the liniment, or a stronger pigment, and to repeat this once or twice daily as often as the patient can bear it. Iodine is, perhaps, generally the more convenient irritant. The smarting lasts a little longer on children, to whom a few breaths of chloroform should not be forgotten. The directions I have just laid down are applicable to any abscess, but in certain localities there are a few modifications that may be made with benefit. Thus, if an abscess be situated in the vicinity of a large artery (as in the limbs or neck), which large artery is more or less an independent or "next" artery, a stripe of counter-irritation may with advantage be established over it. In an abscess (or carbuncle, or boil,

or erysipelas) in the axilla, or in the thorax, near the axilla, a stripe of counter-irritation may be carried along the brachial artery to the elbow. In abscesses of the hand or fingers, all the *uninflamed* part of the hand and the whole of the forearm (or half, or two-thirds, in small abscesses), should be covered with iodine. At the same time a linseed poultice, thick and hot, should be applied to the abscess, and over it should be placed a bandage, or a shot-mattress—which of the two convenience and locality may determine. In either case the object is to secure pressure, which should be moderately firm, but which also should never give rise to pain. Real trouble should be taken to elevate the part by light wood apparatus, or pillows, or both. In abscess in the hand, or fingers, the hand should be held up to the chin by a sling, if the patient be not confined to bed.

With many surgeons the main question in the treatment of the more acute abscesses is—when shall they be opened? When the treatment now described is carefully carried out, it is frequently a superfluous question. *A zone of adequate cutaneous inflammation immediately removes the inflammation, and thereby immediately removes the pain, the pressure on adjacent parts, the tendency to either extension or diffusion, and the danger of opening into important cavities.* In a large proportion it is possible to obtain the absorption of pus. In others spontaneous opening quickly and readily occurs. In a small proportion, however, where the inflammation (perhaps diathetic) is obstinate, or the pain and tension severe, or there is no marked tendency to spontaneous opening, an incision may be made in the usual way. Uniform and moderately firm pressure is a mode of opening an abscess, which is sometimes useful and rapid. The pressure may be arranged in a zonular form with a ring of quoit-like super-imposed layers of wet lint. The abscess will open through the uncompressed centre very rapidly. Even medical men are well pleased to dispense with the knife in their own persons.

The effect of counter-irritation on abscesses is very striking. It takes away the diffused swelling and hardness

around the abscess, and leaves the pus in a circumscribed isolated cavity which projects from the surface with all the distinctness and prominence of a tumour. The skin is slightly red over the round swelling.

If abscesses were not more rapidly cured by means of counter-irritation, the greatly lessened formation of pus and rapid removal of swelling which follow its use would be worth obtaining. With the ordinary treatment, including the use of the knife, suppuration and swelling often remain many days. Incisions themselves in abscesses and erysipelas frequently act as counter-irritants, but curiously enough they are tardy in their effects, because it is their resulting inflammation which causes counter-irritation, and this may not set in for some days, while congestion and inflammation immediately follow the use of cantharides or iodine—hence their value.

In chronic abscess the principles of treatment are the same, but the counter-irritation should be milder, and the zone or other shaped surface larger. Iodine preparations are here of great service.

The common form of chronic abscess, which is very common, is that which accompanies osteitis and caries of bone. But the abscess here is only a symptom, for if the caries could be removed the abscess would cause no trouble. In abscesses from caries of skull, or ribs, or sternum, or vertebræ, or tibia, it is the caries which determines our treatment. Free exit of discharge, cleanliness, or even anti-septicity, and long rest, are more important than counter-irritation. There is some constitutional peculiarity which prolongs local disease; whether we call, or refuse to call it struma matters little.

In the treatment of abscess, as in the treatment of in-flammation generally, I take it for granted that medicines, and all surroundings, bodily and mental, are such as contribute most favourably to the restoration of health. To this col-lateral but most important aspect of treatment I shall not recur.

I shall now cite with designed brevity, the salient

features of a number of cases. In my work on the treatment of surgical inflammations they were given more at length and more in number.

Alice F. was brought to hospital with an abscess in gluteal region, the size of a hen's egg. A broad circle of mild iodine paint (tinc., four-fifths, lin., one-fifth) was applied around the abscess. The next day the abscess opened spontaneously, on the third day the abscess had quite disappeared, and the opening was closed.

Joseph G., age 7, came to hospital with a large abscess in the palm of the right hand. The hand, fingers, and forearm were swelled to twice their natural size. The abscess had been present sixteen days, and spontaneous opening had occurred ten days before admission. The hand, except the palm, and the forearm, were covered with iodine liniment. A linseed poultice, with bandage and sling, were also ordered. In forty-eight hours the discharge had ceased and the swelling had subsided. The hand could be used on the fourth day.

Amos S., age 92, presented himself at hospital with a large abscess at the side of the neck. The iodine liniment was applied freely to a comparatively large surface at the back of the neck. Two days afterwards the abscess opened spontaneously; two days later still, that is, on the fourth day, the opening had completely closed and the swelling had disappeared.

Edwin O., aged 17, had a large strumous abscess of axilla, with extensive redness and induration around. Duration three weeks. A circumjacent zone of integument was painted with iodine liniment and a pigment prescribed for the patient's own use. Fourteen days later only a little induration could be detected. *Remarks.*—This case is important as illustrating a class in which great benefit may be obtained notwithstanding the existence of the strumous diathesis, and where the accompanying abscess is usually extremely tedious and chronic.

James T., aged 35, a smith's striker, came to the hospital with two large abscesses on the forearm, both on the extensor

surface, one near the elbow, the other near the wrist. Iodine liniment was applied to the forearm, except the more prominent portions of the abscesses, the hand and part of the upper arm. When he came three days afterwards, the arm presented a very singular appearance. The swelling of the forearm had entirely gone, and the abscesses were reduced to two circumscribed spherical prominences over which the skin was slightly pink. They were then opened. In thirty hours the swelling and discharge had disappeared.

The Treatment of Phagedæna, Sloughing and Destructive Inflammations.

The treatment of the destructive inflammations will usually be that of syphilis, especially in its tertiary forms. This may certainly be assisted by counter-irritation. Elsewhere will be found some remarks on the treatment of tertiary ulcerations of the nose and lip. It is too much forgotten in our present engrossing attention to methods of dressing that the true way of cleansing a phagedæna or sloughing ulcer is to remove the inflammation which causes it. In destructive inflammations a vigorous zone of counter-irritation is more beneficial (in my experience) than the local application of strong nitric acid. Probably the nitric acid itself acts as a counter-irritant, just as nitrate of silver does to the os uteri, or to the surface of an indolent ulcer, or an incision in erysipelas. *The apparently direct irritation is in relation to the mass of inflamed tissue a positive counter-irritation.*

But the ordinary "nitric acid treatment" has this serious disadvantage—it produces itself a slough where any further slough may be fatal. If sloughing action be already close to the femoral artery (as I have seen it with a fatal result from hæmorrhage), the artificial slough produced by nitric acid may unquestionably open it.

In the cancrum oris of children, now happily rare, I resort to an adjacent patch of iodine irritation, with the kindly aid of a few breaths of chloroform, as an aid to constitutional treatment, which here is of great importance.

PLATE I.

Fɪɢ. 1 shows the application of counter-irritation, in a halo or zone around a carbuncle, or boil, or abscess, or patch of erysipelas, or cellulitis. In this plate and the next, iodine liniment (or pigment) is assumed to be the irritant.

Fɪɢ. 2 shows a mode of establishing counter-irritation in mammary abscess. The counter-irritation may be confined to the inner side of the arm, or to this and the infra-clavicular region. The inner side of the arm should be more freely covered than the diagram suggests.

Fɪɢ. 3 shows a horse-shoe of counter-irritation around a bubo, or inguinal abscess, or inflamed inguinal glands.

PLATE I.

Fig. 1.
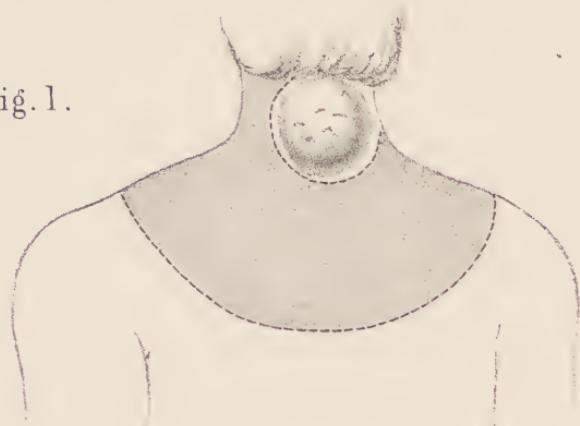
Fig. 2.
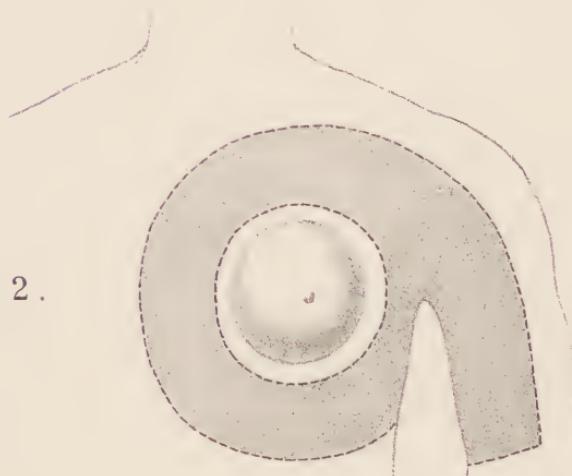
Fig. 3.
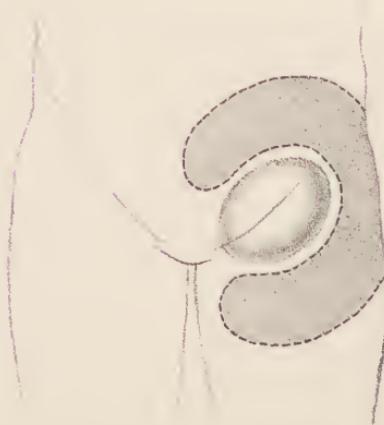
PLATE II.

Figs. 1 and 3 show modes of effecting counter-irritation in inflammatory diseases of the shoulder or knee. The intensity and the extent of the counter-irritation must be determined by the locality and amount of inflammation.

Fig. 2 shows a mode of applying iodine irritation in axillary abscess, or inflamed glands, or other inflammatory disease.

Fig. 4 shows a mode of applying counter-irritation around a node, or other inflammation. The irritation may be effected in two stripes, one on each side of the node, or, in a node of the tibia, the whole of the back of the leg may be covered.

PLATE II.
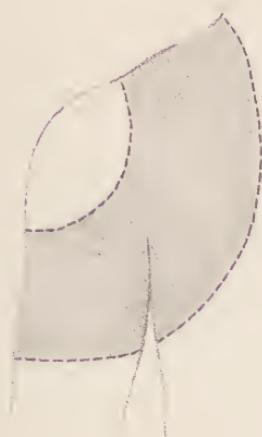
Fig. 1.
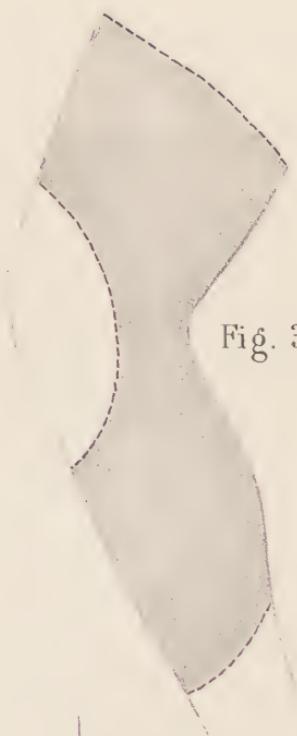
Fig. 2.

Fig. 3.
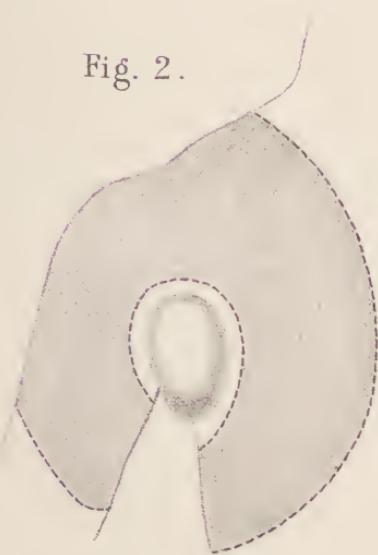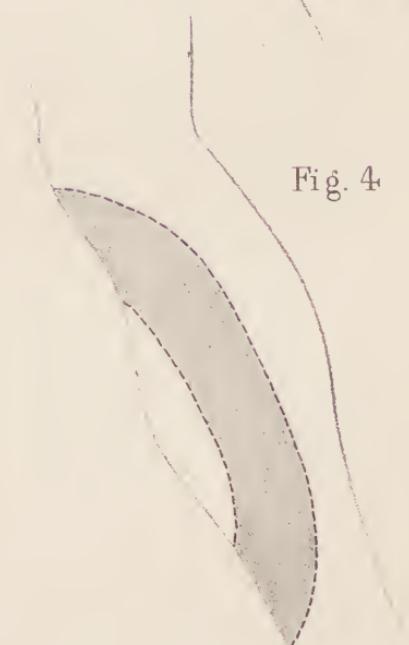
Fig. 4

The various forms of gangrene are as a rule rarely due to excess of purely inflammatory action.

The Treatment of Erysipelas, Simple and Phlegmonous.
Cellulitis.

There are two points in the prevalent treatment of erysipelas which require a few words of comment. A favourite treatment with many surgeons, and one as successful at least, if not more so than any other, is that of the ring of nitrate of silver—the ring alone or the ring and the covering also. The method of treatment is a curious because unrecognised illustration of the value of counter-irritation. It is supposed that a ring of skin moistened with nitrate of silver offers a *physical* impediment to the spread of erysipelas. It would be more correct to regard the belt, narrow as it usually is, as a circumscribing counter-irritation—a counter-irritation having a beneficial influence on the erysipelas as it would have on an abscess or a sloughing ulcer. The broader the zone the more useful it is, and a belt of acetum lyttæ, or a broad belt of iodine irritation is quite as useful, if not more so, than one of nitrate of silver. A zone of acetum lyttæ with a few inhalations of ether, is most serviceable in these cases from its more rapid effects. The value of incisions must be kept clearly in sight—it is greater here than in the treatment of carbuncle and some abscesses. A poultice on the lower limbs, where the circulation is feebler, and an evaporating lotion on the head, neck, trunk, or upper limbs, with mild pressure (shot or bandage), should be applied to the directly erysipelatous parts; or weak iodine, or nitrate of silver solution, may be put over the affected surface, and then cotton wool, with gentle support.

Cellulitis should be treated in a similar manner. Both in erysipelas and in cellulitis in adults we cannot too strongly suspect the presence of diabetes or visceral disease generally, especially of the liver and kidneys; it is the condition of the internal organs, and the habits of the individual, which mainly determines our prognosis.

F

I have elsewhere spoken of cellulitis, and I have inci-
dentally given a striking example of counter-irritation in
cellulitis around the rectum. It is needless here to cite
ordinary cases of erysipelas. Many medical friends have
kindly sent me reports of these and other cases. Their
cases and mine justify, I think, the assertion that the above
treatment shortens more than any other the duration of
these formidable ailments.

Syphilis.

IN constitutional syphilis, from the indurated chancre on-
wards, the specific element so greatly predominates over the
inflammatory as to require the treatment to be necessarily
of a specific character.

But there are not unfrequently syphilitic local conditions
in which inflammation, as such, largely enters. In the
suppurating chancre, a stripe of iodine paint over the
femorals will often remarkably curtail the ordinary duration
of the disease. Sometimes specific tonsillitis of a very
severe form sets in, and will be much relieved by iodine
about the angles of the jaw.

In the suppurating bubo, a horseshoe of iodine (liniment,
or strong pigment), with rest and uniform pressure, by
means of a linseed poultice and shot-mattress, will often
effect complete subsidence in an early stage, and will
rapidly open and heal a bubo at a later stage. Uniform
and moderately firm pressure is an excellent and quick
means of opening an abscess where opening is unavoidable.
I have seen now several cases of absorbed abscess and
bubo, and only good results, locally and generally, have
followed. Secondary and tertiary ulcers, in addition to
constitutional treatment, may be benefited by zones of
counter-irritation, and the more active the inflammation the
greater the benefit. The treatment of destructive ulcerations,
syphilitic as well as simple, has been already described.

Suppurating bubo (with secondary syphilis) rapidly absorbed
by means of counter-irritation and pressure.—A gentleman,
aged 25, came to me with secondary syphilis, and a large

fluctuating swelling on the left groin. I had never seen so large a swelling in the groin. With the circumjacent œdema it measured nine inches in diameter, and encroached considerably on the thigh and abdomen. A broad horse shoe was painted round it, and the irritation carefully kept up. A poultice with a shot bag was applied, and perfect rest maintained. In four days the swelling was only three inches in diameter and singularly circumscribed (tumour-like) with a pink colour of skin. In another week the swelling entirely disappeared, leaving, in the centre, loss of sensation, for a time.

Soft chancres and gonorrhœa : Counter-irritation : Rapid recovery from both.—Thomas J., age 24, single, came to hospital with two freely suppurating soft ulcers, and a copious urethral discharge, with severe scalding. A blister was placed over each femoral artery for the purpose of removing the gonorrhœa, and *with no anticipation of affecting the chancres* or ulcers, or whatever they were. The scalding and most of the discharge disappeared in forty-eight hours. The discharge of the chancres dried in the form of a crust ; they and the gonorrhœa were quite well in a week.

Acute syphilitic destructive inflammation of fauces quickly relieved by counter-irritation.—David A., aged 25, single, had syphilitic ulceration of the fauces, attended with great swelling and severe pain, on swallowing or speaking. The left side was much the worse. A small blister was placed over the angle of the jaw on the left side. As the blister rose, the swelling, difficult swallowing, and difficult speech all rapidly disappeared.

The Treatment of Inflammations of the Cutaneous Structures.

CARBUNCLE.

At whatever stage a carbuncle presents itself, the one chief great remedy is a zone of counter-irritation. A circle of iodine liniment or strong iodine paint, several times repeated, will greatly relieve all the symptoms in twenty-four

hours. The pain is instantaneously removed, all discomfort disappears in two or three days, and frequently, in a few days longer the carbuncle is practically well. If the treatment be adopted when the first hard red swelling appears, the hardness, redness, swelling, pain, tenderness, frequently all subside in a few hours. The wider and smarter the zone of counter-irritation the more rapid the subsidence. A strong solution of nitrate of silver would probably answer the same purpose; a circular blister is tardier in its action, but the acetum lyttæ is very rapid, and is accompanied by only a short period of smarting. If the carbuncle has proceeded so far that more or less cellular tissue is already dead, the slough more rapidly separates from the living tissue which is suddenly deprived of its inflammatory action by counter-irritation. The appearance of a carbuncle at this moment is often striking; the yellow slough in a few hours is protruded in a comparatively dry state, the ordinarily copious liquids which indicate severe inflammation being conspicuously absent. A healthy granulating surface only remains. Where the carbuncle is very large, the inflammation at its height, and the sloughing has just commenced, the treatment is no less remarkable in its efficiency and rapidity, although its duration is naturally longer than is required under more favourable circumstances. This simple treatment, a broad belt of iodine, will cure carbuncle in a fourth, or a sixth, or an eighth of the time required by ordinary measures.

In addition, a thick linseed meal poultice should be applied, large enough to cover the site of actual inflammation, but within the zone of iodine, as the water of the poultice disadvantageously dilutes the artificial irritant; a hot poultice over an iodine surface is also apt to cause smarting. Over the poultice a bandage should be applied, or a shot mattress, as heavy as can be tolerated. Rest, at least of the site affected, is desirable, and as much elevation as is convenient. Happily carbuncles occur mostly at the upper parts of the body, and thus are naturally elevated. Scarcely any dressing is required; the counter-irritation separates the slough better than scissors, and dries up the liquids better than a sponge.

A weak disinfectant application occasionally, especially as a later dressing, if there be time and need for it, will do no harm.

In my experience, following Paget's views, incisions are not needed and are not attended with any benefit.

In the treatment of carbuncle or boils, or of almost any inflammation, when these occur in old and highly irritable persons, or in other persons of extremely irritable or querulous temperament, counter-irritation should be either very mild, or used under anæsthesia, or refrained from altogether. Such persons often prefer a longer convalesence, and they should have their own way, especially when time only is the question. Cases of the treatment of carbuncles and boils are cited together.

BOILS.

A large boil singly, and numerous boils particularly, give rise to great depression and discomfort. The treatment should be conducted on a similar principle to that of carbuncle, and indeed of all inflammations. A zone of counter-irritation should be made which will vary in width in proportion to the extent and severity of the furunculoid inflammation. In a case cited below, a boil on the back of the forearm was accompanied by a swelling which involved two-thirds of its surface. In a case like this the iodine is put on the whole of the dorsum of the forearm, except an inch or two of the apex of the induration, and also over a portion of the flexor surface. When there are several scattered boils, a zone of counter-irritation is placed around each. When they occur in a cluster the iodine may be painted between them, and a wider zone established around the whole number.

Carbuncle on neck: Counter-irritation: Recovery in seven days.—Eliza W., aged 48, came to hospital with large carbuncle on the back of the neck. Sloughing had not actually occurred. A band of iodine paint was placed around it, and in three days suppuration had taken place in the centre, and an opening had formed. The band was made broader, and in four days there remained only a small dry scab, all the swelling, induration, pain, tender-

ness, and discharge having subsided. Constitutional syphilis was present.

Very large boil: a broad belt of iodine: cured in four days.—William P., aged 19, came to hospital with a very large boil on the left forearm—its extensor surface. The swelling was three inches in diameter. The induration, pain, and tenderness were marked. It had been present eight days. The whole of the forearm, except the boil, was covered freely with iodine paint. In twenty-four hours the centre suppurated and burst, the discharge ceased entirely in forty-eight hours. In four days the boil was well, only a small dry crust covering the centre. *Remarks.*—This certainly remarkable case was not a "coincidence," simply because such a boil as this never did get well before in so short a time with or without any other treatment.

Large carbuncle on the neck: Counter-irritation: Very rapid recovery.—Ellen S., aged 37, married, came to hospital with a large carbuncle on the right side of the neck. The hardness, pain, tenderness, and almost purple skin, were striking. A broad horse-shoe of iodine liniment was freely applied in front, below, and behind the swelling. In consequence of some misunderstanding, she did not repeat the application. After the single application, however, the pain immediately ceased, and the tenderness and discharge and swelling rapidly diminished. When she came on the fourth day, a small yellow slough, without discharge or swelling, projected through an opening in the skin. A second application of iodine was made, six hours after which the slough fell out, leaving a healthy ulcer, which quickly healed. *Remarks.*—I am surely justified in speaking strongly here : No case, having reached the same stage, ever got well so quickly before.

Carbuncle : Circle of counter-irritation : Rapid recovery.— George P., aged 55, had a large carbuncle, of fourteen days' duration, on right forearm, with no tendency to separation of slough. The application of iodine to the forearm and hand was followed, in three days, by clean separation of the slough. In six days, only a simple healing ulcer was left.

It need scarcely be said that both carbuncles and boils are the result of some lowered state of health, which should be most carefully attended to; they are, nevertheless, much more successfully treated by local means than are the distinctly diathetic inflammations.

Paronychia.

Every variety of paronychia should be treated on the same principle. The only difference in the detail is the degree of vigour which should characterise the treatment, and this must be determined simply by the degree of intensity of the inflammation which is present. The deep seated variety is, it need not be said, that in which the symptoms are most urgent and in which the phalanges and articulations are most likely to be involved. Suppose, then, such a case presents itself: the whole finger is swelled, hard, red, and intensely painful, the other fingers and the whole of the hand (dorsal and palmar surfaces) should be freely painted with iodine liniment, or a strong solution of nitrate of silver. The affected finger may be painted or not. A thick linseed poultice should be applied with moderate pressure. The hand should then be carried under the chin and supported there with a sling.

In a still more severe case, where the hand also, as well as the finger, is swelled to perhaps twice or thrice its natural size, with suppuration probably present, *the forearm, almost to the elbow,* and the least inflamed portions of the hand, should be freely covered with iodine liniment, followed by poultice, pressure, and the chin-sling. Immediate subsidence of pain and of much of the swelling follow; if suppuration have occurred beyond a certain degree, the abscess will probably open within twenty-four hours of the iodine application, and, having opened, will often immediately close without any continuance of discharge. But if there be no subsidence of pain and swelling in a short period, a period measured rather by hours than days, an incision must be made. The subsequent recovery is greatly accelerated by the counter-irritation.

Severe whitlow of thumb: Counter-irritation: Subsidence in twenty-four hours: Relapse and ordinary treatment but no progress: Counter-irritation again, and again immediate subsidence.—A young woman, a factory worker, was under the care of an observant house-pupil (Mr. Gilbert Smith) with severe whitlow of the thumb. He treated it according to the method advocated in these pages, with entire subsidence in twenty-four hours. Resuming her occupation too quickly, she had a relapse, the ordinary treatment was adopted. After several days, without any change, she said to Mr. Smith, "You will do no good, sir, without some more of that paint." With the "paint" immediate and permanent recovery followed.

Severe whitlow: Counter-irritation to hand and forearm: Rapid recovery in four days.—Edward P., aged 64, came to hospital with hand and forearm twice their natural size, and a large abscess in the ball of the thumb. All the hand, fingers included, and forearm were covered with iodine liniment, moderate pressure, linseed poultice, and elevation were also resorted to. A few hours after, the abscess opened spontaneously. On the fourth day, the thumb was well, all swelling had subsided, and the discharge had ceased almost immediately after the abscess had opened. *Remarks.*—Is it too much to say that this case was cured in one-sixth of the ordinary time?

The Treatment of Inflammatory Affections of the Bones.

In these affections perfect rest and convenient elevation added to general treatment (which, whatever our views on struma may be, is generally admitted to be of much importance, because the affections themselves are so greatly dependent on general conditions), are, perhaps, more important than counter-irritation.

Inflammations of bones are as a rule protracted inflammations, and singularly insidious in their development. If their earliest stages were recognised the advantage of adequate counter-irritation would certainly be great—rest of course being peremptorily needed as an essential basis for the operation of all remedies.

In acute periostitis of the shafts of bones, as seen in the young, suppuration and detached periosteum, and consequent death of bone, are usually accomplished facts before a surgeon is called in, and incisions are immediately demanded. If at the first onset of deep tenderness, and pain, and general fever, iodine could be freely and extensively applied to the limbs, suppuration and necrosis might be spared in some cases, and would be greatly restricted in all. In such cases the greater portion of the surface of the affected limb should be covered with iodine, repeated, twice or thrice, daily, and then at longer intervals. In later stages its use is much diminished, and it should not be used so as to arouse by needless movement the exquisite tenderness which characterises these cases.

In chronic periostitis, or node, notwithstanding that the condition is a specific or diathetic lesion, the utility of counter-irritation is very marked. A free application of iodine to the back of a leg will almost invariably and instantly remove the pain of a tibial node. It is an important adjunct to the use of iodide of potassium, and relieves pain more quickly.

In osteitis, and caries, and abscess, the progress of the inflammation is slow, and it is not pretended here that counter-irritation should be made the leading step in treatment. The occasional use of iodine, when splintage or other apparatus is readjusted, or changed, has certainly some benefit, but it is neither rapid nor conspicuous. If observation tells us that in some cases drawing blood to the skin palpably and conspicuously removes it from a deeper inflammation, reason tells us the main change goes on, though less strikingly and much more slowly, in other cases. While in the slower osteal inflammations counter-irritation plays a less important part than other measures in the group of remedies which it is the object of these pages to urge, such slow inflammations, nevertheless, very clearly illustrate the benefit of the system of treatment as a whole.

In caries the presence of sinuses should not prevent the treatment being carried out. It is commonly taught that

when sinuses are present it is too late to resort to counter-irritation. Apart from the fact that sinuses often occur in osteitis prior to caries, I believe this teaching has done great mischief, especially in cases of wrist and ankle disease. Granting that counter-irritation occasionally fails, why should we relinquish a powerful means of subduing inflammation, unless we are prepared to relinquish all treatment except operative measures? If the state of the caries is not such as to justify surgical interference, why should we avoid counter-irritation more than we should avoid rest? It is true that counter-irritation, where there are sinuses, often fails, but it is equally true that rest also often fails. Is it logical that, because the disease is more severe, the treatment shall be made less vigorous?

The Treatment of Diseases of the Joints.

In many of these diseases the benefit of counter-irritation, pressure, elevation, and rest, is very striking.

In acute and sub-acute synovitis, especially when of traumatic origin, the benefit of counter-irritation added to complete rest is unquestionable. Rest alone here, and in most inflammations, is much tardier in its effects. Iodine (or acetum lyttæ, or nitrate of silver) may be used—more freely above and below the joint than over it, especially if it be a thinly covered joint, as the knee.

DISEASES OF THE JOINTS DUE TO OSTEAL INFLAMMATION.

The remarks on osteitis on a previous page are especially applicable to these. The benefit of the " group " of remedies is again seen, but the changes are comparatively slow. Counter-irritation—mild, occasional, and with judgment, should not be forgotten.

The use of the *actual cautery,* as a persistently acting and powerful counter-irritant, is the subject of much difference of opinion. I shall not enter into any controversy, but simply state the result of my own observation and reason. It is a remedy of great value, I believe, in exceptional cases. Its use is best seen in deeply-seated or thickly-

covered disease, as in the shoulder and hip. It is protracted in its operation, gives little trouble in dressing, and is less painful than the frequent use of more superficial irritants. If suppuration threatens to set up, and in thinly-covered joints, as the knee, the cautery, if used at all, should be used *in one long line over the popliteal space.* In one case, where I used the cautery along each side of the patella, some *extra-articular* suppuration having already occurred, the suppuration seemed accelerated, and other centres of suppuration formed, all external to the joint. The joint eventually did well, and I am not sure the extra-articular abscesses did not really tend to the good result.

In caries of the ankle and wrist, with or without suppuration, I have long been convinced that long narrow strips of actual cautery-irritation with light splintage, free exit of discharges, and time—it may be a wearisome time—give better results than excision and render it unnecessary. Professor Sayre, I am pleased to see, puts forward a similar opinion in his work on joint diseases. Elbow bone disease stands apart rather from other disease, because anchylosis is frequently considered a sufficient cause for excision, and because the results of excision of the elbow are mostly satisfactory.

In the inflammatory affections of *Bursæ*, sheaths of tendons and fasciæ, the use of counter-irritation produces, with more or less of rest, better results than any other treatment.

Sprains may perhaps be considered here as appropriately as anywhere. Those of the *ankle* are the most frequent and the most formidable. The ankle should be immediately compressed by strapping with adhesive plaster. If this does not give relief, a starch or a plaster case may be needed. Just above the strapping, a ring of counter-irritation (with iodine liniment in the first instance) will not only retard and diminish subsequent inflammation, but will also relieve the severe pain. Another successful method, in the ankle and other joints, is first to compress with a domette bandage, and then outside this to apply very hot fomentations; strapping or "case" may follow. Whatever joint be affected, it is most important that it be elevated for a time and completely rested.

Articular osteitis of elbow : Iodine counter-irritation to arm and forearm : Rapid recovery.—Maria B., aged 28, came to hospital with enlargement of lower extremity of humerus, with impaired and painful movement of the elbow, of six months' duration. A light gutta percha splint was applied to the bend of the elbow, after two-thirds of the arm and two-thirds of the forearm had been freely moistened with iodine pigment. Directions were given that iodine should be applied every second day. In a week, the movement of the joint could be made without pain. In six weeks, the recovery was complete.

Severe osteitis of knee : Counter-irritation to the thigh and leg : Speedy and complete recovery.—Mary C., aged 12, came with marked and advancing symptoms of articular osteitis of the knee. There was swelling of the femoral condyles and tibial tuberosities, wasting of the whole limb, starting pains, and contraction of the hamstring muscles. The disease was of seventeen months' duration, and the patient had formerly been in the hospital. Counter-irritation was effected by means of iodine to the thigh and leg, and maintained by removing the light splintage every third day. Recovery was complete in one month, but treatment was kept up as a precautionary measure.

Osteitis of wrist : Counter-irritation to whole of forearm and hand : Subsidence of active symptoms in a week : Complete recovery in a month.—Mary B., aged 15, came to hospital with swelling, pain, tenderness, and impaired movement of left wrist. There were occasional, though not severe, starting pains. The forearm was somewhat wasted. The forearm to the elbow, and the hand, were freely covered with iodine paint (a strong one, so that less frequent removals of splintage might suffice). In less than a week, pain and tenderness completely disappeared. In a month, recovery was complete.

Advanced caries of the wrist, with great swelling and old sinuses on dorsal and palmar surfaces : The actual cautery in four long stripes : Recovery in one month.— Eliza E., aged 39, married, looked 50, came into hospital with caries and sinuses of left wrist, of old standing

(sinuses 12 months, osteitis several years). Four stripes of eschar ($\frac{1}{2}$ in wide) were made with the actual cautery, from the middle of the forearm to the clefts of the fingers, one at the dorsal surface, another at the palmar surface, one at the radial border, and another at the ulnar border. In one month, the symptoms had subsided and the sinuses had healed.

Old osteitis of wrist: Actual cautery: Complete recovery. —Mary B., aged 25, of intensely earthy complexion, came with symptoms of old and severe osteitis of right wrist. The forearm was wasted, starting pains were frequent and severe. The general health was failing. The disease had made constant progress for eighteen months. The actual cautery was applied in stripes over the wrist. The pain immediately ceased, and the symptoms entirely disappeared in eight to ten weeks.

Even in a wrist with numerous and old sinuses, I should make two narrow lines of cautery irritation, and trust to rest and time.

Hip disease: The actual cautery in a long stripe at the front and back of the joint: Good recovery, followed by ostitis of wrist: Iodine to wrist and forearm: Recovery.— Sarah A. H., aged 13, came into hospital with severe symptoms of hip disease, of 12 months' duration. Her general health was quite broken down. The actual cautery was applied so as to produce two stripes of eschar (narrow) one at the front and upper two-thirds of the thigh, over the femoral artery, another at the back, from a few inches above the joint to the middle of the back of the thigh, passing between the trochanter and ischial tuberosity. Rest was secured by a splint. The joint symptoms quickly subsided, but the general health only slowly recovered. Three months after admission, the left wrist suddenly became the subject of osteitis, for which the hand, and part of forearm, were covered with iodine. She left the hospital cured, in four months. *Remarks.*—Recovery here was longer than usually required with this treatment. The profound struma explains this.

Acute synovitis of knee from injury : Subsidence in twenty-four hours.—A medical gentleman brought his right knee into forcible contact with a piece of iron. In a few hours the joint was much swelled, with pain, tenderness, and fluctuation, but without marked constitutional disturbance. The joint, and portion of thigh and leg, were freely moistened with a strong solution of nitrate of silver ; cotton wool and a bandage were then applied. In twenty-four hours, the swelling disappeared. *Remarks.*—The treatment of recent and acute, or subacute synovitis, with arg. nit. applied not only on the knee, but the thigh and leg, for a third or half their length and their whole circumference, is rapidly successful. In more chronic cases, with thicker coverings, iodine is perhaps preferable.

Treatment of Inflammatory Diseases of the Vascular and Absorbent System.

Whether *phlebitis*, as the German pathologists have shown, is or is not an inflammation altogether secondary to thrombosis or embolism, it may be treated locally by stripes of counter-irritation, so also may the very rare inflammatory affections of the vessels generally.

Inflammation of the lymphatics, as indicated by the red lines in the superjacent skin, is a condition which does not require treatment so much as the prior and severer disease upon which it depends. If it should seem to possess any independent importance, a stripe of skin may be painted with a strong solution of nitrate of silver. If the glands to which they lead are also inflamed, the same solution should be carried over them, and for some distance around them. The treatment for suppurative inflammation, in or around the glands, is similar to that described in the next paragraph.

Inflammation of the lymphatic glands is one of the commonest of surgical diseases, and may present any stage of severity, from the most acute to the most chronic inflammatory action. The great majority of cases, however, are those in which the inflammation is very chronic, and present

themselves as cases of "enlarged glands." It is of the treatment of these cases that I shall now speak, as the treatment of acute suppurative inflammation of the glands is the same as that of abscess. Indeed, the difference between the treatment of any inflammatory diseases is one of detail—detail, however, of no slight importance. A broad zone, or semicircle, or adjacent patch of iodine paint is the one essential feature of the treatment. The paint should be moderately strong, or the liniment may be used where the skin is thick. In the very young, the paint should be correspondingly weaker. In these cases it is desirable that no paint should be applied over the glands. Enlarged glands, as every surgeon well knows, are often extremely obstinate, and often refuse to yield to any treatment hitherto known. I have met with more success from the treatment described here than from any other. It does not cure them in a few days, as it often does an acute inflammation, but it removes them in a few weeks, it may be a few months, when the accepted modes of treatment have been tried for years and failed. Pressure with a shot bag for limited periods during the day, the patient lying on a couch or bed with the glands uppermost, is also of service. Internally, I give iron or iron with iodide of potassium. Local treatment, in the cases described, is more important than the general treatment. It is the reverse with enlarged glands from syphilis.

Great enlargement of the cervical glands : Counter-irritation at the back of the neck : Recovery in three weeks, after three years' failure with every other known treatment.—Dr. Hickinbotham has informed me of the case of a young man, with great enlargement of the cervical glands of three years' duration, who had been to many surgeons, and tried every known treatment without benefit. A patch of iodine irritation was kept up at the back of the neck, and in three weeks the whole enlargement disappeared. Many other remedies had previously been tried.

Strumous enlargement of glands in groin : Counter-irritation : Rapid improvement.—George W., aged 13, enlargement of cluster of inguinal glands, of long duration, associated with

strumous ulcers. Iodine paint was applied in the form of a horse shoe, and the glandular enlargement disappeared very rapidly. The strumous ulcers were much more obstinate—they had very little inflammatory action about them.

Great enlargement of cervical glands of three years' duration, and resisting every treatment: Adjacent counter-irritation: Rapid subsidence.—Emma H., aged 15, had enlargement of cervical glands for three years, and tried all kinds of treatment without success. A large disc of iodine was applied to the back of the neck, and the enlargement very rapidly subsided.

Enlarged cervical glands: Long duration: Counter-irritation: Rapid improvement. — James D., aged 33, had strumous enlargement of the glands many years. A crescent of iodine irritation removed the swellings in three weeks.

Enlargement of cervical glands of long standing: Counter-irritation: Immediate improvement.—Ellen R., aged 9, came to hospital with old-standing enlargement of cervical glands, on which much and varied treatment had been expended in vain. A horse shoe of iodine paint was applied around the swelling, with immediate improvement of a very marked character. The subsidence was very rapid until very little enlargement remained, when the progress was not so rapid. *Remarks.*—Probably the treatment was carelessly carried out towards the end.

Treatment of Inflammatory Diseases and of Injuries of the Nervous System.

THE treatment just described is also a successful method of treatment in the *intra-cranial inflammations* which come before the surgeon—those, namely, which follow injuries of the head. After concussion or contusion of the brain, or fracture of the skull, febrile symptoms, especially an elevation of temperature as indicated by the thermometer, should call forth active treatment. The counter-irritation does not interfere with elevation of the head and shoulders, mercurial inunction, or active purgation. A common remedy is cold to the head. I question its utility, although I often resort to it. In its stead, the nitrate of silver may be sparingly applied to the shaven scalp.

PLATE III.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

In *Syphilitic inflammation of the cerebral membranes, or of the brain surface,* the same treatment is also applicable. Here, and in all intra-cranial inflammations, the disc at the back of the neck, or the stripe of counter-irritation from the sternum to the mastoid process, should be especially widened and intensified over the mastoid process, where, for obvious anatomical reasons, it must, from every point of view be most efficient. At the mastoid process the two circulations, extra and intra-cranial, communicate most freely, while underneath and below it are all the great vessels and nerves which are connected with the head.

In the comparatively rare inflammatory affections of the *nerve trunks,* whether due to injury or disease, there is no local remedy of any service which does not act as a counter-irritant. How the counter-irritation shall be produced, and how much of it, must be determined by the depth and locality of the nerve. In such cases, rest should form an important adjunct to the treatment.

Inflammations arising from injuries to the spinal column.— When symptoms of inflammation of the cord or its membranes occur after *concussion* or *contusion,* or *compression,* or twists, or sprains, they are extremely persistent, and very often progressive, in spite of all treatment. Counter-irritation is often resorted to in such cases, but in an inefficient and perfunctory manner. If such cases are not quickly benefited by two long efficient stripes of iodine (liniment) irritation, the actual cautery should be used on both sides of the affected structures, and, seeing the importance of the issues, in a manner widely different from its ordinary niggardly use. I frequently produce long and narrow stripes of eschar by the actual cautery, in cases where, if they fail, there is no other remedy left, and in no single case have I seen shock, or other ill, result. Indeed, in no single case have I seen anything but unquestioned good, if not ultimate cure. Rest, in all spine diseases, is indispensable. The bichloride of mercury is often given internally, with what benefit I am not able to say. In revising these sentences, at a later date, I may point out that, in some cases, a Sayre's jacket may take the place of the above measures.

G

Caries of vertebræ.—The great majority of these cases are now so satisfactorily treated by Sayre's jacket, that the consideration of counter-irritation in their treatment is less urgent than it once was. In rare and exceptional cases, such as those where the jacket cannot be worn, or where the jacket fails to arrest the progress of the disease, the actual cautery should not be forgotten.

The Treatment of Inflammatory Diseases of the Respiratory Organs.

The benefit of a thread seton at the back of the neck in ozœna is so great, that I have treated it separately on another page. In inflammations generally of the respiratory organs in the neck, I would point to the importance of counter-irritation at the sides or the back of the neck. I content myself with this suggestion, as such ailments are not, as a rule, treated by the surgeon.

BRONCHOCELE.

Although not inflammatory, this condition is treated with more advantage by counter-irritation at the back of the neck than by any other method. With this should be combined elastic pressure ; a silk velvet band, with elastic webbing let in at the back, does very well.

Bronchocele rapidly diminished in size by counter-irritation at the back of the neck.—Eliza W., aged 16, came to hospital with a moderately-sized bronchocele. A wide oval patch of iodine at the back of the neck reduced the bronchocele two-thirds in one month.

Bronchocele cured by counter-irritation at the back of the neck.—E. H., aged 14 years, a healthy looking girl, consulted me in October, 1869, for bronchocele. The enlargement of the gland had been present for six months, and seemed to be on the increase. Ordered the enlarged gland to be painted every morning with tincture of iodine. This treatment was continued for some weeks with no apparent benefit. I then directed the whole posterior surface of the neck to be painted with the tincture. In a few days, there was a marked diminution

in the size of the tumour. The treatment was continued, with occasional intermissions, for five weeks, at the end of which time the swelling had completely disappeared.

The Treatment of Inflammatory Diseases of the Digestive Organs.

In affections of the nose, the face is not a convenient locality for counter-irritation; the same remark applies to the *lips*, the *mouth*, and the *tongue*. Many, if not most, of the diseases of the organs referred to are specific, and are to be cured mainly by specific treatment. These, however, may often be somewhat influenced, and simple inflammations may be considerably influenced by counter-irritation. The back of the neck is a good site for seton, iodine, or cantharides, in a large number of inflammatory affections of the structures which lie at the front of the head and neck.

Cancrum oris is so serious a malady, that I should cover the face and neck with iodine pigment or liniment, and give a few inspirations of chloroform during the few minutes smarting would last. In many affections, mild anæsthesia may be induced with benefit, in order to establish efficient counter-irritation.

In *inflammations of the tongue and tonsil*, especially in acute inflammation and abscess of the latter, smart counter-irritation over the angle of the jaw, carried backwards and forwards over the neck, will frequently give marvellous relief.

In *abscesses of the abdomen*, in *pelvic cellulitis, inflammation of the hernial sac*, or *peritonitis* following operations and injuries, a surgeon who believes in the utility of the principle of counter-irritation will see opportunities of applying it in detail. Where the patch shall be, how large it shall be, what the degree of intensity of the irritation, and what the agent shall be, may well be left to the surgeon in any individual case.

Acute tonsilitis: Iodine liniment to neck and angles of jaws, with complete relief in forty-eight hours.—Sarah C., 21, came with all symptoms of acute inflammation of tonsils.

Deglutition was very difficult and painful. The iodine liniment was freely applied to the neck over the carotids, and especially at the angles of the jaws. In a few hours, the relief was very marked; in forty-eight hours, it was complete. *Remarks.*—This is but one of many cases in which I have seen sudden and marked benefit on the application of counter-irritation.

Inflammation of the sac of a large irreducible umbilical hernia, with symptoms of strangulation: Instantaneous relief from a circle of counter-irritation.—I was called to see, in consultation with her medical attendant, Mrs. N., aged 60. An irreducible umbilical hernia had been present several years. For last three days there were vomiting, constipation, and exhaustion. The hernial tumour was not tense or enlarged. In the wall of the abdomen, close to the tumour, and encircling its lower two-thirds, was a crescentic mass of inflammatory induration, which was tender and painful, and of the size of a man's open hand. A circle of acetum lyttæ was applied around the tumour, and opium given internally. All the symptoms quickly subsided; and in twenty hours, nine-tenths of the induration had disappeared.

The Treatment of Diseases of the Urinary Organs.

The *Bladder.*—Inflammation of the Bladder is perhaps always a symptom of some other disease, or an extension of some other inflammation. The success of the surgeon in treating cystitis will entirely depend upon the success which attends his efforts to discover the prior disease, and on the possibility of removing that disease when discovered. When cystitis depends on a cause that can be removed, as stone in the bladder, or stricture, the treatment is obvious. When it depends on causes that are persistent, as enlarged prostate, or paralysis, or atony, or tumours which prevent the egress of urine, the proper treatment is, as a rule, to secure the complete periodical emptying of the bladder.

In the cystitis which depends on the extension into the bladder of gonorrhœal, or other urethral inflammation, a state which is not common, counter-irritation is the best treatment; but before this is used with vigour, it must be made perfectly

clear that there is no stricture from a previous gonorrhœa or gleet, if there be, the use of large bougies is of even more importance than the counter-irritation. Where a first attack of gonorrhœa implicates the bladder, the treatment would simply be a slight extension of the counter-irritation adopted for the cure of the gonorrhœa.

In the cystitis of children, simulating stone in the bladder, there is perhaps always a mechanical obstruction to the urinary flow, a phymosis, or a small meatus, or a congenital narrowing of some portion of the urethra. This should be relieved, if possible, for the persistence of the cause renders all other treatment nugatory.

The Prostate.

In *acute prostatitis*, the perineum, and the adjacent surface of the thigh, should be painted with a strong solution of nitrate of silver, or iodine liniment, and at the same time a stripe of counter-irritation may, with additional utility, be established over the femoral arteries. Very hot hip baths for short periods, eight or ten minutes, as directed by Sir H. Thompson, add to the relief, acting, of course, as mild counter-irritants. Abscess of the prostate must be treated as acute inflammation. If spontaneous opening be delayed the surgeon must open the abscess in the usual manner.

In *chronic* prostatitis, the · counter-irritation should be a little less extensive and may be confined to the perineum. Iodine, however, may be advantageously applied to the adjacent portions of the thigh, in addition to the perineum and the thighs. Much must be determined by the degree of chronicity.

The *Urethra.*—Cases of Gonorrhœa and acute urethritis should (as I have found from considerable experience) be devided into two classes for purposes of treatment, namely, those in which the disease is present for the first time, and those in which it has occurred once or oftener before. The ground for the distinction is this : when the disease has been present before, we can never be sure that *some degree of stricture* is not present; in other words, that a mechanical, as

well as an inflammatory condition, is present, which will require other treatment than that directed to the inflammation.

Supposing the case before us to be a first attack, and there is simply inflammation, no matter how acute it may be, it may almost invariably be cured in *two or three days* by counter-irritation. Acetum lyttæ should be applied in small patches over both femorals, and with this should be combined a disc, or broad zone, of iodine liniment applied daily. A larger surface of iodine liniment will suffice. The diet should be free from stimulants, and an alkaline drink may be taken before meals. If, after scalding and other active symptoms have passed away, there remains a little thin discharge, the iodine zone should be maintained for a short period. The advantages of counter-irritation in such cases have already been demonstrated more than once. The failures in stricture cases have probably prevented its wider use.

If the attack is not the first, but a third or sixth, the counter-irritation should be less active, and when active inflammation has subsided, a large bougie should be passed at regulated intervals.

In such cases, where there is some organic change in the mucous and submucous tissues internal remedies are useless. Purgation (counter-irritation to intestinal canal,) is often of use in inflammation of the urinary organs. Injections are a teazing and inadequate method of treatment which I rarely use. Now and then, if the discharge remains abundant after the acuter stage has passed, the oil of sandal wood or preparations containing it are clearly beneficial.

ACUTE ORCHITIS.

THIS gives, in its treatment, one of the most favourable illustrations of the principles here taught. Curiously also, the treatment has been more widely adopted by surgeons (a large number have been good enough to communicate to me their gratifying experience) in acute orchitis than in any other inflammatory ailment. Curiously, because the intelligent, free, and uniform use of counter-irritation is as beneficial in many other acute inflammations as in epididymitis. Or, perhaps not

so curiously, seeing that the treatment of acute orchitis was published separately in one of our medical serials.

Orchitis has often been cured in twenty-four hours by the following method: the scrotum is painted with a strong solution of nitrate of silver, and a broad stripe of skin over the femoral artery, of the same side, is freely covered with iodine liniment; the scrotum should be covered with cotton wool, and moderately compressed; or iodine liniment may be applied both to scrotum and thighs. If the case be severe or double the application should be free and extensive. It may be well to have a single full establishment of counter-irritation under slight anæsthesia where great severity is present, and time is important. No drugs need be given as a rule.

In other varieties of orchitis, such as the syphilitic, the tubercular and the chronic, the action is so extremely chronic and diathetic (more like the development of a tumour than inflammation) that counter-irritation is of little use.

Sub-acute prostatitis : Iodine liniment to perinæum, thighs, and groins : Immediate relief.—George T., aged 34, married, had gonorrhœa ten weeks before. Frequent micturition, with spasm of neck of bladder, weight, and pain, and tenderness, in perinæum, cloudy urine, and a gleety discharge came on. Iodine liniment was applied in a disc around the genital organs. In three days the pain, tenderness, and vesical irritability were completely removed.

Severe chordee : Counter-irritation successful, when other modes of treatment failed.—Mr. W., aged 22, had severe and painful chordee, which was quite unaffected by the ordinary internal and local treatment. The repeated application of narrow lines or discs of acetum lyttæ at the under surface of the penis, a narrow stripe being applied every three or four days in a new locality. The relief was immediate and progressive, the pain ceased in a few nights, but some weeks elapsed before the curvature quite disappeared.

Severe gonorrhœa cured in two days by counter-irritation.— Mr. B., aged 19, had gonorrhœa for the first time, and suffered extremely from scalding and discharge. Two stripes of blister over the femorals removed the scalding completely

in twenty-four hours, and the discharge in forty-eight. *Remarks.*—Blisters I now use only in exceptional cases. Acetum lyttæ or iodine liniment over a large surface is better.

Gonorrhœa and consecutive orchitis : Counter-irritation : Recovery in three days.—Henry A., aged 17, had gonorrhœa ten days and orchitis one day. Two broad stripes of iodine liniment over femorals, and nitrate of silver over testis, removed the orchitis in twenty-four hours, the gonorrhœa in three days.

Gonorrhœa, of six weeks' duration : Counter-irritation : Rapid recovery.—Alfred E., aged 22, had gonorrhœa six weeks. Had two attacks before. Discharge too copious, and scalding too severe to permit the use of the bougie. A circle of iodine-irritation, of a mild character, was ordered. In fourteen days the recovery was complete. *Remarks.*—Where there is a slight stricture, the counter-irritation should be mild; but, even in these cases, until the bougie can be used, it is the best remedy.

Bubo of gonorrhœa : Counter-irritation : Entire subsidence without opening.—Robert L. aged 58, widower, had a large bubo, with unmistakeably fluid contents. A broad horse-shoe of iodine paint was applied around it, and directions given for a daily application, so as to maintain a moderate degree of soreness. Four days afterwards the swelling had almost disappeared.

Gonorrhœa, implicating the uterus : Striking result of counter-irritation.—A woman came to the hospital with old-standing gonorrhœa. Her appearance was pale and haggard. Sacral and abdominal pains were frequent. A narrow stripe of blister was put over each femoral. She was to rest as much as possible. In six days, she came again, and it was difficult to believe she was the same woman. She was rosy, stout, well, and looked ten years younger.

Double acute orchitis (very severe) : Counter-irritation to scrotum and femorals : Recovery in twenty-four hours.—A man, with severe double orchitis, unable to stand upright, and in great agony, applied for admission into the hospital. The scrotum was covered with a solution of arg. nit., and iodine

liniment was applied over the femorals. Recovery was complete in twenty-four hours.

The Female Breast.

INFLAMMATORY diseases of the female breast are frequent, painful, and depressing. In *acute inflammation,* and in the early stage of *abscess,* a zone of iodine liniment around the abscess should be combined with a stripe of iodine liniment over the brachial artery. Over the whole of the inflamed part a thick heavy poultice should be applied, with as much pressure as is possible without producing pain. The pressure may be effected by a sort of many-tailed bandage (made of three or four broad pieces of calico or flannel), so arranged as to envelope the thorax without moving the patient; or, if the patient is kept in a completely horizontal posture, a shot mattress may be placed over the poultice, and the outer side of the breast supported by a cotton wool cushion in the axilla. Pressure, carefully and gently made, is of the greatest advantage in these cases. Much of what was said on the treatment of abscess applies to mammary abscess (in whatever part of the organ it may be situated), especially as regards the use of the knife. Where counter-irritation relieves pain and subdues inflammation, there need be at least no hurry in making an incision, at the same time in clearly established and abundant suppuration the knife should be used so as to give free and dependent exit. When the discharge is getting less and also in chronic inflmmatory thickening, a very successful method of treatment is to strap the breast, and apply iodine over the brachial region. *Hypertrophy* of the breast, when affecting the whole gland, is much more effectively treated by counter-irritation to the inside of the arm, in addition to pressure, than by strapping alone. Similar treatment is also the best for the clusters of enlarged glands that are occasionally met with between the mamma and the axilla.

Mammary abscess: Opening and closure much accelerated by counter-irritation.—Sarah F., aged 25, applied with an unopened abscess of the breast, of six weeks' duration. There

was much induration and pain, with emaciation and sleepless-ness. Iodine liniment was applied over the brachial artery, and a linseed poultice, with a bandage, to the breast. Pain ceased immediately, and prolonged sleep was obtained.

In a few days the abscess opened spontaneously, and six days later it was well.

General hypertrophy of breast: Recovery from counter-irritation to arm.—A woman, aged 22, single, applied with general hypertrophy of left breast, which was three times the size of the right. Strapping and internal remedies, after a long trial, failed to do any good. Counter-irritation was then effected over the brachial artery, with marked and rapid benefit.

Abscess of breast of five weeks' duration: Counter-irritation over brachial: Recovery by absorption in a week.—Ellen E., aged 20, had a tender, painful, red swelling of the breast, of five weeks' duration. Strapping to the breast and iodine liniment over the brachial artery removed all the symptoms in a week.

(Under Dr. Hodge's care).—*Discharging abscess of the breast: Adjacent counter-irritation: Recovery in three days.*—"On January 31st, M. D., aged 26, married (four children), was brought to me by her mother, one of our nurses, suffering from abscess of right breast. The mamma was twice its natural size, hard, and infiltrated. There was an opening about the size of a sixpence, from which very unhealthy looking pus was exuding. It had existed nine days, and had been repeatedly poulticed without relief. Patient stated that her sufferings had been so great, that she had scarcely had an hour's sleep for the past week, and her looks fully confirmed her statement, for a countenance more expressive of pain and continued sleepless nights, I never saw. Taking the margin of hardness as the point beyond which I should not go, I made a semi-circular ring on the upper part of the affected breast with the liniment of iodine. I continued the iodine well over the corresponding clavicle, and extended the paint laterally, and thus included a pretty extensive surface. I enveloped the breast in cotton wool, and then

applied, as firmly as possible, without causing pain, a flannel bandage, with a view not only of taking off the weight of the breast, but of exciting compression upon it.

"On Feb. 3, my patient called to see me. I was struck with her altered appearance—the pale, haggard look was gone, and she had quite a colour in her cheeks. Upon my asking her how she was, she said, with a smile, 'O sir, I think I am well.' Scarcely crediting quite so satisfactory a condition, I proceeded to examine the breast, and found her statement literally true, the hardness and infiltration were away, the right being as soft and resilient to the touch as its fellow; both breasts were identical in size. The cicatrization was the only means by which we could then have told which breast had been affected with abscess.

"Patient informed me that she had not had the slightest pain or uneasiness since I had applied the iodine, and had slept well every night. I may add, that her gratitude was beyond description." *Remarks.*—I have given this case in the words of Dr. Hodge, and simply remark that it is not very infrequent for abscesses in the breast and elsewhere after they are opened to remain hard and painful, and depressing to the general health, probably because the inflammation which first led to the abscess still continues.

Cases under the late Mr. Turton's care, who wrote thus :— "In several cases of acute inflammation of the mammary gland, which would undoubtedly have ended in suppuration, a free application of a strong solution of iodine around the breast has invariably relieved the pain and other symptoms of inflammation. I think that if it is applied early, the result will always be to prevent suppuration. In half-a-dozen cases only, one gathered. This I opened, and I certainly never before saw one of these cases get well with so little discharge or so little pain."

NOTES ON PATHOLOGY.

(MOSTLY FROM A CLINICAL POINT OF VIEW.)

ON THE SUCCESSION OF PATHOLOGICAL SYSTEMS.

IN this note the term pathology is applied to the minute or microscopic tissue changes which take place in disease. Pathology in this sense cannot be said to be at present a knowledge of any certitude, or to rest on any certain foundation. This is not because the ablest minds have turned to other pursuits. The workers at pathology have been, and are among the acutest of observers and the deepest of thinkers. Nevertheless, pathological systems are short-lived. At this very time we are under the spell of a new, startling, and complete system of pathology, and the enthusiastic or the young delude themselves into the belief that we have at length reached pathological truth. In diagnosis and treatment our knowledge grows from one step to another; in pathology our supposed knowledge is forgotten, or swept away, or reversed. Treatment is an evolution; pathology is a series of cataclysms. Living men, still young, have heard during one generation, discussions on "exuded lymph," "molecular blastema" "formed and germinal matter," "proliferation of cells," and "migration of leucocytes," as the true explanations of diseased processes. They have probably believed in each in its turn. Some, before they die, will believe in a few more systems.

In clinical pathology, and in such pathological knowledge as we can acquire by the unaided senses, and by reasoning, we make certain, if not rapid progress. Diagnosis improves treatment, surgical treatment, at least of late, has made marvellous strides, but a singular spectacle presents itself as far as pathology is concerned; fact is ahead of theory; practice has outrun precept; we are curing ailments before we know what they are. The dressing of wounds never before received so much attention, and every science (except that of microscopic pathology) is called in to assist. Surgeons

generally seem to have resolved themselves into a committee of dressing, and the epitaph on the present race of surgeons will be "it was a generation of superior dressers." The practical tendency of the time is well seen in the efforts to improve the treatment of operative wounds and injuries. Poetical surgeons dwell on the danger of cancer. Matter-of-fact surgeons dress wounds. Possibly our children's children may smile at our pathological gropings—at our views of exudation, or proliferation, or migration—they cannot smile at anæsthesia, antisepticity, bloodless operations, aspiration, spinal splintage, and a legion of new operations and appliances.

The explanation of the succession of transitory pathologies is obvious. Clinical investigation and treatment are processes of direct *observation;* microscopic research is a process of *interpretation.* In clinical matters we *read,* in microscopic we *decipher.* Six trained observers would describe the clinical origin and progress of an abscess or a cancer in similar terms. Six trained microscopists would give six different accounts of the origin and progress of the same diseases. In thus lifting ourselves out of the stream of current microscopic detail and custom may we not learn this lesson? Better microscopes are wanted, better appliances, other methods of enquiry, practical advances in optics, a larger and truer knowledge of physiology. We must know more of the origin, development, structure, changes, and action of the healthy tissues, before any real step onward can be made in the minute structure and origin of diseased tissues. No doubt physiology and pathology tend to throw light on each other; but the next great move rests with physiology. It is well that pathologists should continue their labours, and it is inevitable that some generalisation will accompany observation; but it is not well that surgeons should say "at length we have a clear view of pathological truth." A tissue element may be seen to be dividing, or a cell may be seen passing through a vascular tissue; but how far are such appearances essential, how far accidental? Can "systems" of pathology be built upon them?

It is surely of the utmost importance to make advances in minute pathological knowledge. Diagnosis is nothing more

than the detection and discrimination of pathological states. If diagnosis as an art is to make progress, it must be in a great measure because our knowledge of pathological changes makes progress, and our knowledge of clinical, rough, non-microscopic pathology, is more likely to be kept crisp and ready for use the more closely it is related to correct microscopic knowledge of tissue changes. Diagnosis at present is merely the detection of groups of clinical phenomena; we cannot diagnose the real essential elements in disease until we know what they are.

Continuity in Pathology.

It is meant here that there are intermediate pathological states. It is well understood that there are morbid growths which stand midway between innocent growths on the one hand, and malignant growths on the other. There are also morbid growths which are sometimes wholly innocent, and which in other cases are entirely malignant. It is acknowledged also that a sharp line cannot be drawn between the tuberculous and inflammatory processes. May not cancer and inflammation merge into each other by intermediate gradational steps. I have held and taught this view for many years, and I expressed it in the first edition of this volume. Since then somewhat similar views have been stated by various, and especially by German observers.

I can at present speak only in brief terms of the continuity of inflammation and cancer. Abscess is not infrequently seated in or in close proximity to cancer; cancer occasionally follows abscess, it may be after an interval of apparent local health, or it may be that one induration does not subside before the other appears, whether by gradual change, or by substitution, or by succession, or by a combination of these we cannot tell. The diagnosis between inflammatory indura-tion, and cancerous induration is from time to time one of great difficulty—of greater difficulty than is usual between innocent growths and cancerous growths. Long continued in-flammations, as in sinuses, ulcers, and carious bone often merge

into cancers. Old cicatrices, which are tense and inflamed (not the soft and uninflamed) it is well known are extremely prone to take on epitheliomatous action. Inflammatory granulations appear to pass gradually into cancerous warts. Is there in such cases any precise time at which it can be said—now inflammation stops, now cancer begins? In the interpretation of microscopic appearances, it would be at least hazardous to say that intermediate forms are not present. The clinical features of inflammation have much in common with cancer. In both there are swelling, pain, tenderness, and redness, both ulcerate and slough, both infiltrate the adjacent parts, both form adhesions, both implicate the glands, in both the temperature is elevated. When cancers slough and ulcerate, they are said by some observers to be attacked by inflammation. But as all cancers tend to slough and ulcerate, are we justified in assuming that another and alleged independent action is superadded? A coincidence which is constant ceases to be a coincidence; singular, or, to some, absurd as it may seem, I think I have seen in extremely rare cases an undecided, vacillating, irresolute, pathological process. In one case of old carious bone the character of epitheliomatous cancer apparently set in; but again, in time, these characters melted away and gave place again to those of a more typical inflammation. It seemed as if two pathological principles were quietly contesting for mastery, and now one, for a time, and then the other slowly prevailed.

The Continuous Extension of Pathological Action in the Tissues.

This is another kind of continuity well worth attentive consideration. It is a favourite idea with some German histologists that the human body is a large mass, or cast, a model of connective tissue, into which nerve, muscle, blood and other elements are inserted for special purposes. This connective tissue is the chief seat of diseased processes. If we start a morbid action in this widely prevailing structure, there is scarcely a limit to the extent to which it may go.

In emphysema following thoracic injury, air, it is well known, will permeate all the softer or looser varieties of connective tissues, but it probably does not enter tendon, or dense facia or bone. Inflammation, while more limited in its total area, will extend from the loosest areolar to the densest osseous tissue. The skin of a limb is in reality continuous with the marrow in its central bone. Observation leads me to believe that a severe surface inflammation, erysipelatous or carbuncular, or other, extends to periosteum, bone, and marrow. Extension of inflammation from marrow, bone, and periosteum to the skin is frequently seen. From a synovial surface to the bone in a joint there is no break of continuity. A well timed examination would probably show that there is never an acute synovial inflammation which leaves the bone unaffected. A woman, several years ago, sank from the exhaustion of acute purulent puerperal synovitis of the left hip. I made a careful examination of the parts in consequence of previous reflection on allied cases. I determined to make a section of the head of the femur and the trochanters on *both* sides. The result was startling. While the right femur presented on section through its centre a healthy pinkish appearance, the section through the left femur showed a deep crimson—almost a port wine colour.

In amputating near joints it occasionally happens that synovitis follows with effusion. Quite recently, after amputation below the knee, in a hospital patient, acute synovitis of the joint followed. The formation of healthy (skin) flaps necessitated removal of the bone within an inch and a half of the joint. The amputation healed solidly, and only at the margin of the flaps was there a limited amount of suppuration. The mild inflammation of repair running along the periosteum sufficed to set up synovial inflammation. The extension by continuity of tissue in joints here spoken of is commonly recognised. I wish to suggest its frequency and its importance in other localities.

In an old and persistent inflammation of one part of a limb, every structure in the limb may gradually become involved. In an osteitis of the femur, of very long duration which came

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under my care several years ago, the whole connective tissue of the thigh became a dense solid grey mass in which the walls of the arteries and the neurilemma of the nerves were incorporated and more or less lost in the general sclerosis. More than this: the sclerosis of the thigh ran upwards into the pelvis, and was especially marked around the external and common iliac vessels.

Late secondary hæmorrhage came on in a thigh stump, and it was believed to be necessary to tie the external iliac artery. I certainly put a ligature around a channel through which arterial blood ran, but the arterial coat seemed to be lost in a homogeneous mass of connective tissue. That secondary and fatal hæmorrhage followed the application of the ligature was not surprising. It is an easy step from sclerosis to ulceration. A *post-mortem* examination showed that the ligature was accurately enough placed around what was once an artery. The bone disease here was noteworthy. There was great thickening of bone and periosteum with a patch of old suppurative caries and a few necrotic fragments. It originated in early boyhood (the patient was thirty-three), and probably as a node from hereditary syphilis.

It is not in chronic cases only that unexpected continuity may be found. I have a strong impression that in some obscure acute and sub-acute abscesses the origin of the inflammation is in the periosteum, which arises rapidly, gives rise to suppuration, and rapidly subsides. I shall have occasion to speak of this again in a few notes on bone diseases.

The extension of acute inflammation of bursæ to the cellular tissue around (cellulitis of a limb sometimes arising in this way), and of inflammation to bursæ from adjacent parts is well known. A curious example of the latter process appeared in my hospital practice. A young adult came with a large boil on the left buttock—large but uncomplicated. When he came a week after, the buttock was of immense size; the boil seemed better. Had there been an error in diagnosis? Was there a large abscess? Careful examination showed that the swelling was due to enormous fluid distension of a large bursa under the large gluteus muscle, and clearly

set up by extension of the furuncular inflammatory action. On this the boil floated just as if it were on a water bed. The thin-walled fluctuating swelling soon disappeared.

The Fewness of Diseases, or Pathological Processes, as Bearing on Diagnosis.

This fact has an encouraging and educational aspect which might with advantage be placed before the young student of medicine. The most industrious of young men when he sees the vastness of medical libraries and museums, the activity and detail of chemical and physiological laboratories, the labour in dissecting rooms, operating rooms, clinical wards, operating theatres and pathological theatres, naturally dreads the prospect before him, or doubts his capability of creditably filling his part. It would be well occasionally to tell him that the primary diseases he is called upon to understand and to relieve can almost be counted on the fingers ; that in professional life he will be called upon to say of the thing before him—is it an inflammation, or a cancer, or a tuberculous product, or an innocent growth, or a degeneration, or an injury, or a mechanical condition, or a poison, or a parasite.

In relation to these primary ailments, are doubtless numerous questions of locality, causes, varieties, stages, complications and so on; but in acquiring the habit of philosophic diagnosis, it is necessary to keep constantly in sight fundamental principles. The highway of diseases must be learned before the bye-paths are traced : the highways of disease are the pathological actions which arise in the body and the conditions which come to it from without. These are not numerous. To the surgeon who frequently deals with enlargements, a constant question is this : is there here an inflammatory product, or a malignant, or an innocent growth ? Less frequently, is there a displacement, a dilatation, an effusion, an extraneous body ?

The paramount importance of being guided by principles rather than by details is seen (giving a very simple example) in the examination of a severely injured limb. A surgeon oppressed by detail tries to arrive at a detail first and last ; a surgeon guided by principle ascertains

first, if the injury be, say a fracture, or a dislocation, before
he says where the fracture is or what is the nature of the
dislocation.

The So-called Immediate Union of Wounds.

This is probably nothing more than a rapid and favourable union
by methods which are present in the process of union generally.
Whether this process be one depending on an exuded
fluid, or a proliferation of cells, or an emigration of cells,
or on some other action, it is probably the same process,
although with modifications, in all kinds of union and under
varying conditions. The uniting medium, whether slight or
abundant, thick or thin, transitory or persistent, is apparently
some form of connective tissue. This uniting layer is not
only found by careful observation in some, by cursory
observation in others, but it explains certain histological
difficulties. If on any grounds we could accept a hypothesis
of "union without time, or material, or process," the histological
difficulties would seem to be insuperable. Can a capillary
instantaneously become organically continuous with a nerve
fibre, or a muscular filament with a globule of fat?

In cases of extremely rapid and favourable healing there
is probably first of all mechanical union. If two moist but
clean surfaces are brought together in close contact, all
hæmorrhage having ceased and all air squeezed out—
atmospheric pressure helps to keep them together—as it
keeps the femur in the acetabulum. Boys have an amusement
bearing on this point. At the end of a piece of string is a
bit of stout leather, the under surface of which is wetted
and kneaded on to a stone with a smooth surface; the stone
is then lifted and carried about merely by atmospheric pressure.
In cases of the early healing of wounds mechanical union
is followed by rapid organic and vital union without pain,
or tenderness, or redness, or induration. Whether at any
future time a kind of glue (or liquid gut) can be devised
which will assist mechanical union and not retard organic
union, which will not be a foreign body incapable of absorption,

or which would also seal up the divided vessels, is certainly a matter of speculation, but the absorption of solid gut lifts the idea above the level of an idle dream.

On Constitutionalism or Localism in the Origin of Cancer.

In matters concerning human health and life, there is no more important question than this: is a given ailment cancer or not cancer? In morbid growths it is the one distinction to make; it is a distinction between life and death; it is a distinction so fundamental, early, and irrevocable that no metaphysical cobweb-spinning or verbal criticism can destroy it.

When does this distinction between malignancy and non-malignancy in a growth begin? Does it first begin solely in a local change, or is the beginning still earlier—in other words, is the origin "local or constitutional?" This appears to be the salient point in the discussion between what may be called two schools—the localist and constitutionalist.

It will clear the ground if we first ascertain what we know and what we don't know in the matter before us. We do know—we know too well that cancerous tumours grow rapidly, are painful, invade all tissues, involve the glands, are attended by ill health, and destroy life. We know that non-malignant growths grow slowly, are not associated with ill health, and do *not* (except by accident) destroy life. The two sets of growths are the antipodes of each other. But we do *not* know *how* cancer originates, or *when* it originates, or *where* it originates. To discuss, for example, whether it arises in the solids or in the blood is scarcely more profitable, with our microscopical and chemical knowledge, than to discuss with the schoolmen, the question of how many angels can dance on the point of a needle. It is a phase of our ignorance which has been too much concealed. The relation of the solid organs and the blood is so intimate, and their reciprocal influences so active, that it is difficult, if not impossible, to say where any pathological action *begins*. Man is not made of blood only; nor does he consist of

solids only; nor, indeed, is he a combination of liquid and solid. He is the one constantly passing into the other. He is not a catalogue, or an addition sum; he is a transmutation. The blood is constantly being converted into solids, the solids are constantly becoming liquid. In the race from the maximum of liquidity to the maximum of solidity, and back again, who shall say at what particular step disease begins? But if the change is constantly going on, disease must begin in and during the change. It is, therefore, impossible to say whether normal blood running through normal solids can become cancerous or cancer-producing, or whether normal solids with normal blood running through them can become cancerous, because probably the moment one is diseased the other becomes so.

It is true we are also ignorant of the mode of origin of innocent growths. They are excessive growths of natural structures. Quite possibly they also are of so-called constitutional origin. But here our ignorance stops. We clearly know that wherever, or whenever, or however they begin, they are from first to last, in time, character, methods, and endings, totally different from malignant growths.

A difference between two groups of tumours which amounts to death in one group and to life in another, is so vital as to be one of principle. Even if, up to the moment of the tangible appearance of a new mass, it could be proved that the local and constitutional states were similar, the question of life or death from that moment is one that cannot be called a detail, and one that calls for a designation. It has been customary to call the always life-taking tumour "constitutional," and all others "local." Granting that the innocent growths are in a certain sense constitutional (as in this sense are nails and hair) the basic difference, even if both are constitutional, is so great that pathological truth is still best preserved by retaining the terms "constitutional" and "local," until a better phraseology is devised—a better phraseology the "result of time," will probably bring.

The question of constitutionalism or localism, touching the origin of cancers, when clearly stated, seems to render

discussion unnecessary. In all directions in which human observation can go, we know only a succession of phenomena —a chain of events. We have no self-sufficient causes, or causes of causes, no spontaneously arising causes, except in the domain of "faith." Antecedents and sequences follow each other in inevitable order. Malignancy is not a new, sudden, spontaneous event; it is a link in a certain chain of events; the events or states which lead to cancer, can lead to cancer only, just as the changes which lead to innocence lead to innocence only. In one sequence of events *something tends to malignancy*—this something we say is constitutional, or specifically constitutional. A man of twenty-five has a fatty tumour in the subcutaneous fat which lies in the line of his braces; another man of fifty-five has a cancer in his rectum. Is it possible to suppose that the states, or succession of states in these men, were alike before or at the time their morbid growths came into existence. To some minds the question may be made clearer by the use of another kind of phraseology. A man has a malignant growth in his rectum: Why? Because of the action of certain causes, which are not, at present understood, but which nevertheless unquestionably exist. These causes, or train of causes, are so fundamentally different, that we call them constitutional. These causes are so deeply operative in the system, and control so strange and deplorable a clinical course, that we should still cling to some phrase that would startlingly map them out from all other pathological causes and effects. To my mind, it is singular that any experienced observer can deny that, even on practical and clinical grounds, there is evidence of an altered constitutional state prior to the appearance of a local growth. In my experience it is the rule for failing health to appear before any tumour. It may be said that a local change may be arising which is not obvious to our senses; but this is a mere assertion, and its negative does not need to be proven. A man withers slowly—he becomes thinner, weaker, and frequently acquires a greenish-yellow colour; then a cancer appears on the hand. During

the withering process, that hand was for months, or a year
or two, in as perfect local health as the other hand. The
cancer, amputation or no amputation, eventually kills him. A
woman becomes weak, thin, and green, and then a cancer appears
in the foot. These cases are not exceptional; I speak from ex-
perience. It is true, that occasionally a man or woman comes
before us with a cancer, who is at the same time stout and red.
Strict inquiry will probably show that the stoutness and
redness are less than formerly, and it will certainly show
that debility was complained of long before any local
symptoms appeared. Stoutness and redness are very un-
reliable evidences of the absence of a constitutional ailment.
Stoutness and redness are found frequently in all diatheses—
in struma, tubercle, gout, syphilis, and cancer—they are found
possibly in all these, even when death is not far off. The
statement that the cachexia of cancer is due solely to discharges,
hæmorrhage, and pain, cannot be accepted, because death
often puts an end to cases where there is no discharge or
hæmorrhage, and in which pain is not a marked symptom.
Thus it is in many internal cancers, and is not infrequent
in the external. Cancer of the testis for example is uni-
formly fatal without any breach of integument. In most
cases the cachexia is out of proportion to the local disease.
Neither is the bulk of the cancer by its large abstraction
of blood from the general current a cause of death. An
innocent tumour of much greater size leaves the general
health uninjured. No doubt loss of blood and discharges
shorten life, but seeing that all cancers kill their victims,
it is a mere accident, a detail, that bleeding and pain kill
some victims more quickly.

Now it is a curious and conspicuous circumstance, that no
cachexia precedes, or accompanies, or destroys life in inno-
cent growths. The apparent and rare exceptions to this
rule are accidental and non-essential. Again, then, we are
justified in saying that whatever the difference between
malignant and innocent growths may be, wherever, when-
ever, and however it begins, it is so real, vital, and fun-

damental, that the terms "constitutional" and "local," inadequate as they may be, cannot be given up until better are offered in their place,

The invariable return, as a rule, of cancer after removal points to some mode of origin very different from that of the innocent tumours. A number of cancers have been removed at the earliest periods, and if cancer were a local disease surely by this time a certain proportion of undoubted cures could be referred to. They do not exist; we do not expect them. More than this, it is not only conceivable but probable that if we could know that a given woman were to have a cancer of the breast twelve months hence, we could not save her by removing her breast to-day. In the course of time the next favourite locality would be attacked. Indeed, it is not improbable, that if we could remove every part in which cancer could appear, what was left of her would probably, in time, die of cancerous cachexia.

Constitutionalism is no argument against removal, especially early and wide removal of cancers. If it take many years to develope a cancer in the most favourite locality, and this be removed, it will probably take a few more (how many will depend on the intensity of the constitutional "taint") to grow one in the next most eligible site.

The contention here made is by no means weakened by the fact that there are intermediate growths; growths with characters, it may be so uncertain that it is difficult to say whether they are malignant or innocent. Because the colour grey exists, it does not show that white and black are not at the antipodes of each other. Whether the intermediate growths have special modes of origin and character and histories, or whether they are embodiments of a mild or struggling, or dying malignancy, we do not know. Here continuity in pathology may be profitably remembered. Mildness—extreme mildness of a so-called constitutional state is often seen. A gouty man has merely pain in his toe for ten minutes once in ten years. A syphilitic man may have after twenty years of sleeping syphilis a single tertiary ulcer near his knee joint. The mildness of a non-local taint

is no proof there is no taint. A thousand smokers escape cancer; one gets an epithelial cancer on his lip. Is it not probable that there was a very slight tendency to cancer in his case, seeing that so many escape? A thousand sweeps escape cancer; one becomes the subject of epithelial disease. Has he not a mild, non-local taint? But let the non-local taint be a little stronger, and cancer will appear without obvious exciting cause—perhaps on the lip, though the man may not smoke, or on the scrotum, though the man may not be a sweep. The facts, at least, are undoubted, whatever interpretation we may put upon them.

NOTE ON THE DURATION OF LIFE AFTER THE REMOVAL OF CANCER OF THE BREAST.

IT is a noteworthy circumstance that the length of life after the excision of a schirrus growth from the breast varies very much in different individuals. Statistics help us little in predicting the probable numbers of months or years which may run after an operation in any individual case. One woman may live ten years, another ten months. It is because the experience of operating surgeons is more valuable than a general table of statistics that I now briefly refer to my own experience. I need scarcely say that in the great majority of cases life is not prolonged beyond one, or two, or three years. In this conclusion all surgeons will probably agree. But we get a small minority of cases in which life is singularly prolonged, and it is only just that such cases should be noted.

In February, 1872, I removed an unmistakeably cancerous growth from the breast of Mrs. L., aged about 50. For seven years she had good health, and died, her medical adviser tells me, of apoplexy, in August, 1879. No *post-mortem* examination was made. She was *not* one of the dry, wiry, thin women, in whom we expect life to be more prolonged. Easy removal, and especially removal with a very wide margin of healthy tissue, probably best explain the seven years.

In 1870, I saw, with her medical adviser, a lady of 45, with a cancer in both breasts. We told her that very high

authorities discourage operative steps in double cancer, and that the prospect was more serious than in cases of single growth. The woman's answer was not encouraging, but it was very importunate. She said: "My mother had cancer in both breasts; she refused an operation; she died from pain, discharge, and debility, a miserable death, and I will not die like her if I can find a surgeon anywhere who will take out my cancers." It was impossible to refuse so painful a request. I removed both breasts. Some months ago (1880), a medical friend, living in another suburb than the one in which the lady lived when I operated upon her, said to me—"Do you remember Mrs. F., on whom you operated for cancer?" I said, "Yes. How long did she live?" To my great surprise he answered, "She is alive now, and well."

In 1870, I removed, from a lady of forty-eight, a healthy-looking, naturally thin woman, a circumscribed scirrhus of the breast. The glands were not affected. I cut very widely of the growth, especially removing all the superadjacent skin. She is now (1880), her family physician tells me, in excellent health. A small patch in the centre of the operation wound was a long time in healing in consequence of the free removal of the skin—a free removal, nevertheless, which has been a great boon to her.

Such cases, probably, most surgeons of experience meet with (and as probably do not record them), and it is a just and legitimate encouragement to give the poor victims of so terrible a disease some knowledge of their occurrence. It is only honest, I need scarcely say, to give this kind of encouragement in cases which are suitable for operation. The grounds on which the suitability or unsuitability of the use of the knife are decided are well known and discussed, if not unanimously agreed upon.

Clinical Note on the Painful Subcutaneous Tumour.

It is not proposed here to discuss the pathology or histology of the painful subcutaneous tumour, or to consider the question

of the relationship of this growth to the nerves, or to compare or contrast it with the neuromata. There may be some difference between the attachment of a painful subcutaneous tumour, or a neuroma to the nerve trunks, or cylinders, but we must bear in mind that if the painful subcutaneous tumour were not in relationship with the nerves it certainly would not be painful. Only nerve structures convey a painful sensation.

My object in this note is to record a few curious coincidences in regard to the painful subcutaneous tumour. Several years ago I saw three cases. They came under my notice within a limited number of months. They all occurred in men who were between early adult and middle age. The men were all rather thin and of a highly nervous temperament; they all drank to excess, and when not in a state of delirum tremens, they were constantly on the verge of it. In all the cases the painful subcutaneous tumour was seated on the lateral aspect of the trunk. In all the growth was small, and was the subject of calcareous degeneration.

In all the cases the pain and tenderness were very severe— how far the severity was due to temperament or to alcoholism, or to both, is an important question, needing for its solution further experience.

All the growths were removed (two by myself) and all were followed by recovery from the symptoms complained of. Two of the men I have lost sight of; one I occasionally see in the streets, but of his habits or health I cannot speak. As already remarked one or two questions suggest themselves. Had these three cases nothing to do with alcoholism, being merely coincidences, or did alcoholism promote calcareous degeneration and pain? Or had the degeneration nothing to do with the pain? Are such tumours more frequent than is supposed, and painful in only highly nervous or alcoholic temperaments?

ON THE NÆVOID ORIGIN OF SOME CONGENITAL HYPERTROPHIES.

Some years ago, a youth about 16, came to me at the Queen's Hospital, with seemingly great hypertrophy of the cutaneous structures of the right side of the face. There

was some enlargement of the right face at birth, but a clear account of this could not be obtained—the lad's parents and the lad himself were less than ordinarily intelligent. The enlargement had slowly but continually increased in size until a recent date. The eyelids, cheeks, and mouth on the affected side, hung in huge folds (see plate III., figs. 3 & 4) overlapping the neck. The right eye had not been opened for many years, and could not be exposed by any force which he could, or would, bear. Careful manipulation disclosed the presence of deep, convoluted, firm cylindrical tubes. On this evidence and on my experience of other old nævoid growths, in which no operation had been performed, I believed the enlargement to be due, in the first instance, to a nævoid tumour, in which slow inflammatory changes and degenerations had taken place. I removed a large elliptical mass, the incisions being carried very deeply, and the appearance of the parts removed confirmed the opinion I had previously formed. Very deep in the mass were tortuous bluish white veins, with greatly thickened walls and small channels. The vessels were surrounded by rather firm, elastic, greyish connective tissue.

A young man came to the hospital with some comparatively trifling accident. In size he was of average stature, with one exception, the radial half of the forearm—the radius thumb and forefinger bones, skin, and nails, were those of a giant (see plate III., fig. 1.) The forefinger was curved near the end so as to lie on the back of the other fingers. The integuments on the radial margin of the forearm were not only greatly thickened, but they hung not quite in folds, but in fold-like masses. To the fingers these masses gave in some degree a feeling like that of the folds in the face of the youth previously described. Since my brief note on this case in the first edition of these enquiries, the man has again turned up, and was brought to me by Mr. Wright Wilson, who has given much attention to the case in the way of descriptive measurement and photographs. Mr. Hutchinson has a photograph, which he obtained, I believe, in Vienna, of a very similar,

but still more remarkable case, in which both the forearms were alike.

It seemed to me reasonable to suppose that, there being a more or less common origin to the vessels of all the structures of the radial half of the fore-arm, one large trunk supplied a nævus and another gave a uniform enlargment to the bones. This disposition of vessels was, it may be conceived, established at such a period of fœtal life that a much larger vessel led to the formation of a bigger bone. It may be asked why the bones of the right face were not enlarged in the case of integumental hypertrophy apparently due to old nævus. The answer is not only clear but tends in some degree to confirm the view now taken. The vessels to the bones of the face are distinct from those which supply the integuments of the face.

It is not necessary to discuss here the changes which take place in untreated nævoid growths. Whether inflammation, slight or moderate, took place in the above case or not is perhaps not easy to say, but inflammatory complication in neglected nævi is not unusual.

THE CONSTANTLY MOIST ANTISEPTIC SPONGE DRESSING.

It is the object of this enquiry to show that a sponge of suitable size, shape, and softness, put directly on a wound (operative or other), properly adjusted and kept constantly moist with an antiseptic fluid, is a surgical dressing which has many advantages and few disadvantages.

The way in which the constantly moist and antiseptic sponge dressing is used is briefly this. A sponge, soft, trimmed, and moistened, big enough to overlap the area of the locality operated upon or injured, is put directly over and in contact with the parts. It is kept on with the desired pressure by means of a few neat turns of thin bandage or long straps of adhesive plaster. Holes are next cut in the bandages or straps to give free access to liquids. A medicated liquid, which may readily be made strong enough to prevent septicity, and weak enough to prevent skin irritation, should be poured every thirty or forty minutes into the sponge through the openings and at uncovered margins, if there are any. The dressing must be kept moist night and day. A large vessel of suitable fluid, and a little jug which can readily be dipped into the vessel, should be always at hand. The sponge may be left, no reactionary hæmorrhage or other accident interfering, many days. When it is desirable to repeat or readjust the dressing, the same sponge may be cleansed, antiseptically moistened, and applied in a similar manner.

This dressing, so conducted, gives rest, splintage, and protection; it maintains position of parts, and prevents pain. It affords any desired pressure for adjustment, or drainage, or arrest of hæmorrhage. It not only continuously cleanses and drains, but it maintains active antisepticity or medication. It may be made the medium of maintaining any temperature. It may be applied for a moment, or it may be left for a week or a fortnight. In simplicity it is unrivalled.

If this statement of the merits of the dressing is at all truthful, it deserves a more careful if not a lengthened examination.

A sponge, by its bulk and softness, is in itself a good splint—a sufficient one in many operations. The mobility of one part of a sponge on another, as the upper on the lower, gives marked protection from accidental movements or blows, or friction. The soft splintage and compression of a moist sponge keep up delicate adjustment as well as any desired position—a great boon in perhaps awkward flaps, corners, and margins, such as are left after "conservative " operations for injuries. Rest, adjustment, and gentle pressure prevent or diminish pain.

The easily regulated and peculiar pressure of a sponge secure many useful objects. Of its utility in maintaining apposition of parts mention has just been made. It is of great value in the treatment of hæmorrhage. Pressure which is not at all severe arrests hæmorrhage from the smaller vessels. In newly-performed operations it is well known how sponge pressure on the cut surfaces will for a time check hæmorrhage, even from the largest vessels. In some operations, as in certain cases of removal of the breast, where the axillary glands need to be taken away, and where the vessels are numerous and spout vigorously; and also in some amputations, especially near the trunk, by a bit of sponge being put firmly on the vessels, and left in the wound (Mr. Lister's writings first suggested this to me), the margins of which are, more or less, approximated, and a large sponge put outside all, bleeding is not only quickly stopped, but the total loss of blood is much less. Here I need scarcely say that the first dressing should be changed and the enclosed sponge taken out as soon as the probability of primary and reactionary hæmorrhage has passed away. In operations and injuries involving the hands (especially) and the feet, the hæmorrhage being free, and from many and not large vessels, the advantages of a firmly pressing sponge are clearly seen. There is probably some physical peculiarity in sponge which tends to arrest hæmorrhage with a minimum of

PLATE IV.

Shows methods of using constantly moist and antiseptic sponge dressing in removal of breast, injuries of the head, operations for hernia, and amputations at ankle and hip.
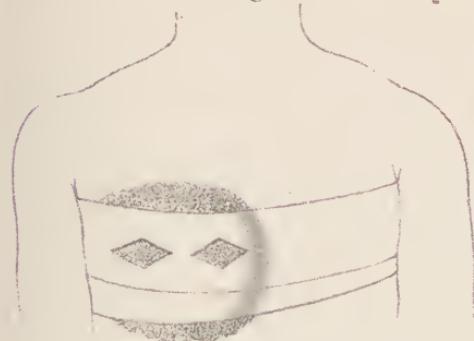
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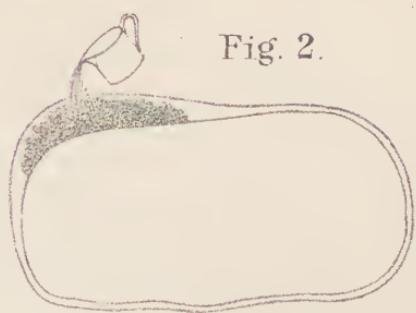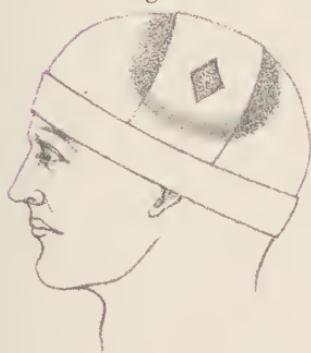# PLATE IV.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

mechanical pressure. Protracted pressure with lint or cotton wool, sufficient to arrest hæmorrhage, would cause sloughing; it is not so with sponge pressure. One great feature of sponge pressure is its elasticity when moist. Without elasticity there can be no gentleness, no adaption, no equable and diffused uniformity of pressure. The difference between elastic pressure on the one hand, and dead mechanical pressure on the other, is fundamental—a difference of principle, not of detail.

Sponge "bites" the skin, and thus materially helps to keep the superficial parts in place. The advantages of deep and maintained adjustment in obtaining deep union are so great that any dressing which secures them has no common merit. Even putrefaction loses much of its evil, if it be putrefaction of merely surface fluids. But the pressure which secures deep adjustment not only prevents accumulation of fluids, and thus produces effectual deep drainage—it does more. Moist sponge pressure so acts that lodgment of fluid on the surface is also prevented. The use of drainage tubes is easily combined with the sponge dressing; but cleanliness and drainage are so constantly obtained by the soft, moist sponge pressure, that I do not always use them. In case after case I found that the space occupied by the tube was the only spot not united. This was especially so in the removal of the breast and other tumours. The use of the drainage tube may be left to individual judgment. The drainage of a sponge is diffused, uniform, and complete. Only a sponge can do two things at once—drive fluids to the surface and take them from the surface. In short, a proper sponge, or sponges, properly applied, constantly squeezes out on the one hand, and sucks up on the other, whatever (if any) of fluid—serous, sanguineous, or purulent—there may be.

This is not the time to consider the question of inflammation, or the conditions which prevent its origin and retard its progress; but I am of opinion, as I have elsewhere and many years ago urged, that ample space is needed for a prosperous inflammation, and that gentle, uniform, and quiet compression discourages it. Neither ought we to lose sight of

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the fact that the evils which retard the favourable progress of wounds are in a great measure due to inflammation. Putrefaction is a powerful enemy, but it is not the only one that meets the surgeon. That putrefaction much aggravates and frequently causes inflammation, there is no doubt. It is significant, however, that abscess, erysipelas, and cellulitis are inflammatory in origin, and may be of the gravest character while remaining in entirely subcutaneous localities. I cite these as practical clinical facts, and have no desire to draw from them abstruse and controversial inferences. I do not say that living organisms may not reach such changing tissues ; but I contend that we must not forget that there is an actual inflammatory process, and that it plays an important part in wounds quite independently of putrefaction.

The most complete antisepticity may be kept up by a moist, medicated sponge. It would seem that septicity could scarcely reach a wound which, while still everywhere moist with antiseptic fluid, is immediately well covered with a constantly moist antiseptic sponge. For antiseptic or medicative purposes there is a choice of agents—carbolic acid, terebene, thymol, zinc salts, and others. These, in solution, should be weak enough to prevent irritation to the skin, but still unequivocally antiseptic. Should exceptional circumstances require the sponge dressing to be retained more than, say seven to fourteen days, there will be no difficulty with the skin. If after the first few days there is domestic or nursing difficulty in the renewal of the fluid, then oily fluids, as terebenised, carbolised, or thymolised oil, added to the sponge, keep up a soft, comfortable, and antiseptic dressing. For the same reason a little glycerine may be added to the watery lotions.

Prolonged undisturbance of the first dressing is a real gain to any dressing. In many, especially the larger operations, and under ordinary circumstances, I keep on the first sponge for a week or longer, thus securing rest, avoiding pain, inflammation, mental disquietude, and promoting union. The diminished labour and anxiety to the surgeon are not trivial, though they should not be allowed to weigh in favour of treatment not otherwise commendable.

Some other qualities of the sponge dressing can only be hinted at. It may be kept at any temperature by the application of hot or iced fluids. The sponge should not be thickly covered, and certainly not with water-proof fabrics, unless the action of a fomentation or a poultice be desired— a rare need in treatment after operations and wounds. This dressing may be made of any size or shape. It may readily be put over straps, stitches, drainage tube, acupressure needles, catch forceps, or other apparatus. It may be put over any wound in any position. It is very manageable, and cannot easily get out of place; but if displacement should occur, it is easily rectified. As regards economy, if that were important, much could be said for the sponge. It may be as effectually cleaned as a steel blade, and re-used with as much propriety.

How best to secure these advantages may now be considered for a few moments. In the operation—removal of breast, or tumour, or amputation, or what not—the sponges have been used with carbolic or antiseptic water, so that the last step before closing the wound has been the complete moistening of all surfaces with antiseptic fluid. In some cases, say when there is obstinate oozing from small vessels, distension of the wound may be made with cold antiseptic fluid, and a suitable sponge quickly and properly applied. *There will then be no further oozing.* This result, in moderately skilful hands, may be relied upon, and it is one of the chief merits of the moist elastic dressing. It is, however, needless to say that, whatever dressing is used, the more free the wound from bleeding the more favourable the union. As regards hæmorrhage during the operation, time, pressure, cold, or heat (with black cautery or extremely hot water) for the smaller vessels, and torsion or gut for the larger, are, perhaps, best adapted to promote union. The wound may be closed with not too many stitches because of the adjustive properties of the sponge, and very long strips of plaster may be used. The moisture of the sponge over the wound does not interfere with the strips even in the vicinity of the sponge. The sponge about to be put over the wound lies apart, well cleansed, and soaked in antiseptic fluid. Already trimmed to a suitable shape, it

should be thick enough to give clearly elastic pressure, and big enough to cover the wound in all directions; not the incisions only, but a little more than the whole area of the wound. Indeed, pressure around a wound is more important than immediately over the incisions. The prepared sponge is then put on with suitable adjustment and pressure, and fixed firmly by a few turns of bandage, or one or more broad strips of adhesive plaster. The way in which the sponge is applied is not unimportant. The bandage should be thin and broad, and only a very few neat turns used—enough, however, to cover the wounded area. In many cases a very broad and a very long strip of plaster is the most convenient fastening agent; it should be so arranged that the two ends of the strap may meet over the sponge, the two ends overlapping. A pin or a stitch may usefully help the adhesion of the plaster. A glance at the diagrams will save more lengthened detail. When the two ends overlap, the centre of the strip lies, of course, at the other side of the limb, or trunk, or head, as the case may be. In some cases, as in most amputations, and in the removal of large tumours, two sponges may be better than one, the two being more or less approximated when put on.

After the sponge is put on, the next step is all important: care must be taken that some portions of it are uncovered, so that fluids may be freely and frequently poured into it. This is best effected by taking the point of the scalpel and cutting out holes over the sponge after the dressing is properly arranged. The holes should not be less than an inch across, and may be elliptical, or four-sided, parallel with the length, and not on the edge of the bandage or strap.

The kind and strength of fluid, the need for careful renewal night and day in the earlier days, the vessel of fluid and the little jug have been already spoken of.

A word more about the sponges. For large operations and wounds the honey-comb sponges do very well, although the Turkey sponges are better, because they are finer and softer. In examining a number of sponges the different degrees of softness is striking; some are actually hard, and should be

avoided; *soft and velvety sponges may and ought to be obtained.* With such, some delay or forgetfulness in the moistening process would be less important. A hard sponge allowed also to get dry is an actual irritant.

As a fact of practical bearing, I affirm that in the experience now of several years I have found no difficulty in getting the antiseptic jug used regularly by the clock. Regularity is, however, more certain in the operations in the private practices of my medical friends where there is a separate nurse than in hospital practice. Keeping up antisepticity is not a practical difficulty. The friends who are told the importance of the matter keep a watchful eye open. A nurse, a watch, and an antiseptic jar are the three things a surgeon leaves behind him, and the friends will look after them.

To the question, How long should the sponge dressing be used? the reply will be—not very long; a period to be measured by days; but then, the number of days will depend on the size, and kind, and locality of the wound, and the healing or vital power. It should be retained until all danger of primary and recurrent bleeding has ceased; until deep union is fairly established and there is little fear of the separation of parts and the discharges (if any) have become slight. All these results I usually find on removing the first sponge in three, four, six, eight, or ten days. The important fact to which too much attention cannot be given, that a fluid, while antiseptic need not be irritating, puts it in the power of the surgeon to use the sponge as long as he chooses. Where it is kept on beyond a number of days a slightly oily character may be given to the antiseptic fluid, especially if the nursing forces are not all that could be desired.

A constantly moist antiseptic sponge dressing may be used in nearly all surgical operations where a soft, antiseptic, draining, rest-giving dressing is needed, such as the removal of the breast and tumours generally, amputations, resections, herniotomy, castration, amputation of the penis, trephining, and many others. In certain localities, as at the mucous outlets, where functional exigences demand a single, easily

removed, and easily renewed dressing, a persistently antiseptic sponge is most useful. Perhaps it may be more clearly seen where it is useful by looking at the cases where it is not suitable. In opening large cavities such as the abdominal (or the thoracic) cavity for the purpose of exploration or for the removal of tumours or fluids, the method of Mr. Lister, whose name is indelibly stamped on the surgery of operations and wounds appears more suitable. The moist dressing is of especial service where at the operation the helping hands are but few, and when a simple dressing is a matter of compulsion. This remark is especially applicable to operations in private practice, where the facilities for operations are not great, but where the whole nursing energy is directed to one patient.

In removal of the breast and of tumours generally, the constantly moist antiseptic sponge dressing has special advantages. The sponge should be large (in all operations it is better too large than too small), say, in a woman of average size, ten or twelve inches long, five or six inches wide, and four or five inches thick. It should be placed directly over the stitches or strapping. If strips of plaster be needed to relieve tension, they should be very long, reaching from *over* the shoulder to near the groin; their utility is thereby increased and their adhesion is not impaired by the moisture of the sponge. The sponge may be fixed with a few neat firm turns of broad thin bandage, and suitable holes made for the frequent reception of a mild antiseptic fluid. If it be necessary to extend the operation into the axilla, and there is bleeding not easily checked, from many vessels, a bit of sponge fixed in the wound for a few hours is very useful. When it is necessary to retain dressings *within wounds*, as in the kind of case just named, or in the removal of the upper jaw, terebene is a suitable antiseptic and agreeable moistening fluid; it is the most perfect dressing for a surface other than cutaneous. In the removal of a breast I rarely tie a vessel; one or two may be twisted, or compressed a few minutes by spring forceps; but patient pressure for a time with relays of well-wrung sponges rarely fails to stop

primary hæmorrhage. It frequently happens to me, especially in cases occurring in the practice of my medical friends, to find when the moist antiseptic sponge is taken off at the end of the week, a row of bright silver stitches, entire union, a pale skin, and not a drop of pus. The general directions for the use of the constantly moist antiseptic sponge dressing have been purposely given with so much completeness as to render a description of its use in individual operations less necessary. For similar reasons I need not detail every operation in which the dressing is of benefit.

In amputations of the limbs sponges may be readily made to cover the incisions, support the deep parts, check hæmorrhage, drain, and secure rest. Several months ago I had a case of amputation of the hip-joint in a youth of sixteen. There was old disease of the shaft of the femur with implication of the hip-joint and bony anchylosis. In a previous severe and extensive operation much dead bone had been removed, but sinuses remained; the limb was a useless burden, preventing locomotion, and the general health was being periously reduced. The debility and emaciation were so great that, although I began the operation with two or three alternatives before me, I resolved beforehand to quickly remove the limb at the hip rather than lose much blood. In the hope that I might find one or more necrosed fragments, I made a longitudinal incision over the trochanters and upper part of the femoral shaft. In exposing the bone the vessels of the enormously thickened and dense periosteum bled so vigorously and from so many rigid and uncontrollable tubes that I feared, even with instant amputation at the hip, I should not get the patient to bed alive. The abdominal circulation being arrested, I instantly broke down the osseous union at the hip; a few strokes of the knife, added to what had already been done, enabled me to turn out of the wound the upper third of the femur. I sawed this off, and then a circular sweep by the circular method, with a long knife (at hand in case of need) removed the limb. No more blood was lost. The principal vessels were tied, and a sponge

soaked in terebene was left within the wound in preference to tying the smaller vessels which oozed when the abdominal pressure was removed; over this the flaps were firmly fixed with a few deep, thick, silver stitches, and large sponges were fastened outside with a broad long strap of plaster coming over the opposite shoulder in such a manner as to evenly compress and support the stump. A glance at the diagrams will again save the time of both writer and reader. I did not expect the youth to live many hours, and I was therefore a little astonished to learn next morning, twenty-four hours later, when I entered the hospital, that he was " very well," words which I incredulously repeated more than once. It was quite true; he had had no shock; he was better than before the operation; no fever or other ill symptom followed. The urgency of the case having been so exceptional, the "interior" sponge was left three days. The outer sponges were moistened every half hour with terebene and water. On removing the outer sponges the flaps were clean and white, and had everywhere united over the enclosed sponge. The wound was opened at the outer aspect and the retained sponge gently rotated or screwed out. The moist sponge dressing was put on for another week, and practically our patient remained " very well." A small portion of periosteum in contact with one side of the sponge had lost its vitality, and subsequently came away with a few drachms of pus. A little later a small abscess formed at the outer aspect of the stump, and was traced to the broken anchylosed surface. This, and a small sinus which followed, in no way retarded a rapid return to stoutness and good health. In this case I believe life was saved by the sponges, the internal and the external together immediately checking the bleeding when another drop might have been fatal, and supplying at the same time a quick antiseptic and restful dressing.

In the summer of 1878 I had, in conjunction with her family advisers, an opportunity of sharply testing the utility of the moist antiseptic sponge dressing in a Symes's amputation. The case was that of an elderly lady, the subject of marked senile struma. She had been for some time bed-ridden with

old and extensive tarsal disease. There were good grounds for suspecting mesenteric disease also, but the tarsal mischief kept her in bed, was getting worse and could be removed. The stump was put into a cup-like, soft Turkey sponge, which was held (gently here) in place by means of a broad strip of plaster (see diagram), and kept antiseptic and moist with very weak carbolic lotion for eight days. In this case with a necessarily hollow flap I put in a piece of drainage tube. When the sponge was taken off union was everywhere complete except the singularly well-defined space occupied by the tube. Not a drop of blood or pus or other discharge could be anywhere traced. The sponge, even at its internal surface, was as clean as when put on after the operation, eight days before. The canal left by the tube was closed when the sponge was next taken off. The sponge was reapplied in this case at the suggestion of the family advisers as the most convenient as well as the best dressing. Considering the resently sawn cancellous surface of the tibia and fibula on one side of the wound and a cup of soft parts on the other, I was greatly struck with a result I had never seen before with any other kind of dressing.

There is one drawback in using sponge in some amputations—as on the thigh low down—the sponges are not easily adjusted and held in place. The question is one of mechanism and merely applies to some amputations only.

After operations for hernia a large soft sponge under a few firm turns of spica bandage, to which the antiseptic jug's contents can have free access through suitable openings, is an ideal dressing. It gives at once a dressing, elastic truss-pressure, drainage, antisepticity and rest. I do not say that it will always prevent discharge, or keep vitality in injured structures, but it gives admirable adjustment and keeps off putrefaction.

In cases of castration the moist antiseptic sponge dressing is of great service from the proximity of mucous outlets. Not long ago where the diseased testis was of extreme size the wound became in a few days quite superficial. The patient was walking about in less than ten days. A T bandage here is convenient. In this and some other operations

the patient in a few days may be trusted to take charge of the antiseptic jug.

In the deep excision of cancers from the mucous outlets, —a branch of surgery in which it has fallen to my lot to have much experience—I should be much at a loss if I had not at hand an antiseptic, styptic, compressing and draining sponge. I have recorded a case of cancer of the rectum, in which I removed the parts up to the levatores ani and from one tuber ischii to the other. Here an antiseptic sponge was the most reliable dressing.

In 1877 I removed a cancerous penis as far down as the triangular ligament in the perinæum. To do this I found it necessary to split the scrotum, as the man preferred to retain his testes. During the operation the bleeding was vigorous, as it always is in this locality; but at the close of the operation a sponge with a catheter passed through its centre stopped the bleeding, dressed the wound, and kept it antiseptic all at once.

The following case affords evidence of the utility of the moist antiseptic sponge dressing in trephining. A young man was brought into the Queen's Hospital with a cut fracture of the skull, caused by the fall of a slate. There was much comminution and depression of the bony fragments, the membranes were much torn, and the brain bruised; as much brain matter as would fill a walnut shell oozed out of the wound. Left hemiplegia was marked, but not complete. The trephine permitted many fragments (eight) to be removed, together with a portion of felt hat, leaving a gap two inches long, one inch and a half wide ; the depth of bruised brain must have exceeded an inch. The soft parts were loosely adjusted, and well covered and overlapped by a very soft sponge, kept constantly moist with terebene, and fixed by one strip of plaster twenty inches long and three inches wide. The strip was so arranged that, the middle being under the chin, the two ends came over the sponge, so that the latter could be removed and readjusted with very little trouble. His progress was most favourable. Some hernia cerebri appeared in a few days, for which nothing was done save the continued mild antiseptic

sponge pressure. He went out with a sound, depressed cicatrix and with less hemiplegia. One of our house surgeons has told me since that he thinks sponges were specially designed for trephining cases.

There are some operations where the styptic properties of sponge may be advantageously utilised. I have found that after lithotomy, when there is free bleeding, there is no mechanism which equals in accessibility, simplicity, and efficiency an elongated bit of sponge—a big sponge tent in fact—passed by the side of an elastic tube or catheter. In lithotomy wounds, as elsewhere, when the sponge is put within the wound it speedily creeps into every corner, crevice, or recess from which blood may flow. It is on this principle that an ordinary uterine sponge tent, passed along the floor of the nose, as suggested by a surgeon whose name I forget, quickly and effectually checks epistaxis. In operations on the sphincter ani I use a bit of sponge or a sponge tent; it does not tend to slip out of place, and it can be kept antiseptic. Here the use of terebenised oil would render frequent interference unnecessary.

There is at present a tendency to expect too much from mere dressing. We must remember that no dressing will quite get rid of inflammation, or erysipelas, or shock, or other evils, because these are not always due directly or indirectly to septicity. The great aim of a dressing is that it shall, by simple and attainable methods, secure all the conditions which favour the healing process.

Not long ago there was, and justly, a great dread of sponges—a dread which was tersely expressed thus: "Whenever and wherever you see a sponge, throw it into the fire." The introduction of efficient antiseptic fluids has changed all this. The medium which most readily conveys septicity, most readily also conveys antisepticity; a sponge, in truth, conveys, renews, or maintains antisepticity with signal convenience and efficiency.

Hitherto, on a few occasions, a sponge has been left on or near a wound as a temporary expedient, and with a lurking sense of slovenliness. Sponges have also been

recently proposed as economical adjuncts to the Listerian treatment.

It is proposed here to use sponges in obedience to certain principles, in order to effect special purposes, and under indispensable regulations. The object here is to show that a *constantly moist and antiseptic sponge* is a surgical dressing, which possesses many merits and few demerits. Its chief demerit is, that it requires for some days all the time and attention of a separate and reliable nurse; its merits are, that it quickly and simply secures adjustment, cleanliness, drainage, antisepticity, protection, and ease. It can be adopted where the hands are too few, and the opportunities are not adequate to more elaborate methods of dressing. (See illustrations, plate IV.)

NOTES ON SYPHILIS.

The Treatment of Syphilis.

Whether, in spite of sentiment, prejudice, ignorance and theology, syphilis will some far-off day be got rid of; whether dualism will gain ground or continuity in local venereal lesions be established; or whether syphilis will be classed among the fevers or not are subjects on which there will be a difference of opinion until we know much more than we now do. Happily in the matter of treatment there is more unanimity of opinion and practice.

In my own experience (hospital and private) it is with extreme infrequency that I meet with the soft sore; putting aside herpetic and other temporary eruptions and abrasions, I rarely find local lesions devoid of well defined induration. No doubt this is a curious coincidence, curious certainly, because I have requested our house surgeons and friends to bring me examples of typical soft sores; after efforts continued during several months they fail to do so. In these remarks the treatment of hard chancre and of constitutional syphilis only is spoken of. The methods here advocated are very uniform and simple. In common with many others I adopt this principle:—give mercury in the primary indurated sore as soon as its character is recognised as well as in the secondary stages. Let the mercurial course be mild, continuous, and prolonged. My experience enables me, however, to emphasise a few points in the treatment of syphilis. *An extremely small dose of mercury is sufficient.* The quarter or fifth or sixth of a grain of calomel, with half a grain or a grain of Dover's powder, should be given twice or thrice a day until some very slight indication (as on the gum) of its action appears. In the great majority of cases, evidence of mercurial influence quickly shows itself. Then one dose daily, at bed time, should be taken for say some weeks, unless the action on the gums exceeds a mere trace, which is quite sufficient, when the mercurial fraction should be taken on alternate days. In the great majority of cases the quarter-grain dose every third, or

fourth, or fifth day will maintain a very mild but all-sufficient influence which may be kept up for very many months—twelve, eighteen, or twenty-four. The guiding rule should be :—give the smallest dose at the longest interval which will show and keep up mercurial action. The red soft line on the gum, or some increased saliva, or a coppery taste, are together or singly the signs of such action

But cases sometimes, though not commonly, come before us where the evidence of the influence of mercury is difficult to get; in such cases large doses do not succeed better than small ones. One of three methods of treatment may be used in such cases. If the progress of the case is satisfactory with the small doses twice or once daily let well alone; if secondaries however appear, or appear more severely, or relapse, let the mercurial be given more frequently—three or four times a day, or oftener. Or, and perhaps better, a little blue ointment spread on lint (the size of a florin), may be worn inside the upper arm, and frequently renewed, or a little fresh ointment added every day or two. It is extremely rare (never in my experience) with these small doses, to find either abdominal pains or diarrhœa complained of—if they are, the mercurial ointment on the arm is sufficient. I have known a disc of mercurial ointment the size of a sixpence keep up mercurial action for many months.

The Treatment of Specific Sloughing, or Phagedænic Ulceration.

In destructive inflammations of any kind attacking tertiary lesions, as also in suppurative action when occurring in constitutional syphilis, it is frequently taught that mercurials should be avoided. In my experience these are grave incidents in which mercury is eminently satisfactory. From time to time, cases of severe destructive inflammation ensuing on the deep tertiary ulcer in the vicinity of the joints, have been sent into the hospital for amputation. In one case the ligaments of the ankle were exposed, in another the cavity of the knee was in great danger of being opened. In these and in similar cases, minute and

very frequent doses of mercury immediately arrested the sloughing process. When the stage of cleaning arrives, it would be well to trust mainly to large doses, where they can be borne, of iodide of potassium. During the stage of active destruction or active suppuration, the iodide is not so effective. A method of treatment which answers very well is, in many anomalous or obstinate cases, to give one minute dose of mercury at bed time, and one or two large doses of iodide of potassium earlier in the day.

DESTRUCTIVE TERTIARY ULCERATION OF THE NOSE OR LIP.

THIS, although rarely so rapid as it is in the lower limbs is of far greater moment, because of appearances. The treatment of extremely free iodides, and extremely limited mercurials may be supplemented by a measure which I have found of great utility. In addition to the constitutional remedies, put a few threads (two or three) under the skin at the back of the neck. If this be objected to, a patch of iodine irritation at the back of the neck will be of less, but still of great service. The threads I have used in a good number of cases, and whatever the extent or severity of the sloughing process, it has in no single case failed to stop it. In sloughing or tertiary lesions in the lower limb, a big patch of iodine irritation on the opposite aspect of the ankle or knee materially assists internal treatment.

THE TREATMENT OF GUMMATOUS PRODUCTS BY THE PARENCHYMATOUS USE OF IODINE.

I desire to make a brief note here. My experience is at present limited to few cases, but these were so striking that I note them for suggestion if for no other use. In the case of gummatous disease of the nose on another page, where the products were found external to the nasal bones as well as within the nares, after some years, one of the internal masses took on a polypoid or pedunculated form of a more diffused character. This was injected on two occasions with ten drops of tincture of iodine, and entirely

and quickly disappeared. Is it not well worth while in gummy deposits in accessible sites to repeat this method? In gummy products in the testis where their locality is well defined, it would seem a useful treatment. Gummy growths, in muscle especially, when they reach a large size, are extremely slow in subsiding. A few years ago, a woman of thirty was under my care, with a gummatous mass in the right rectus muscle, between the umbilicus and the pubes, the size of the fœtal head. She had small but similar masses in the pronator teres and the infra spinatus muscles of the left upper limb. A young man came with a mass the size of two fists, in the upper and outer part of the thigh. These cases made very slow (the latter scarcely any) progress under the iodides. In similar circumstances I would now resort to the parenchymatous use of iodine. Curiously, while revising these sheets, this young man has again come under treatment, and has been in hospital some weeks. He has had injections of the tincture of iodine (ten drops) once in four or five days; the swelling is less than half its original size, and is steadily diminishing.

A Node of the Bones of the Elbow Modelled by Pressure.

Although these notes are mostly confined to questions of the treatment of syphilis, I may here interpolate a few lines descriptive of a case of syphilitic periostitis of the lower end of the humerus and the elbow ends of the ulna and radius. A cachectic looking man, approaching middle age, with a clear history of syphilis, came to the hospital with considerable enlargement of the lower third of the humerus and upper third of the radius and ulna. The swelling, although chronic had a little more tenderness than is found in ordinary nodes, and there was slight œdema in the soft parts in the vicinity of the elbow. There was no evidence that the joint itself was directly involved; there was severe tenderness in moving it, but this was apparently due simply to pressure on the swollen periosteum. The man had constantly worn a figure of eight bandage around the elbow, and always exactly in the same place, so that a deep indentation was left in the soft parts

and also in the periosteum. The deep periosteal indentation was unmistakeably obvious, and was carefully distinguished from the indentation in the superjacent soft parts. The superficial depression was probably due to some œdema, so slight that long continued pressure left a figure of eight pitting, which only very slowly disappeared. Ordinary pressure with the fingers or a pencil produced no pitting.

A Case of Gummatous Disease of the Nose simulating Malignant Polypus Externally, and Simple Polypus Internally.

We had recently, in one of our surgical wards, a woman with a singular deformity of the nose, of a character and history which I have not seen or heard of in any other case. At the same time, I willingly admit that there is no part of the body in which gummatous products may not be found.

The history of the case was briefly thus:—Mrs. P., aged 30, and a widow. In early life was subject to chronic glandular swelling and ulceration in the neck. At 16, these left deep and lasting cicatrices. At 21 she married, but had no children. Six years ago she lost her husband, at which time she began to suffer from discomfort and obstructive breathing in the left nostril; she was supposed to have polypi, and says she was operated upon more than once, but that the operations gave no relief; a seton was then put into the nostril through the cheek below the inner angle of the left eye, and brought out at the nostril. This also gave no result. At the same time that the nasal trouble began, she observed swellings external to the nose over the long portion—one on the left was the first to appear. These slowly increased in size, but have remained stationary for two or three years. There has never been any blood or other discharge from the nose, or any fœtor of the breath. At present there are flattened biconvex swellings over the nasal bones, the left a little higher than the right; they somewhat resemble flattish

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marbles embedded in a diffused softer elastic tissue, and give the nose a peculiar frog-like, disagreeable appearance. The discs have no adhesion to the skin. In both nasal cavities there springs from the outer wall, a prominent ulcerated surface, with rather a bright margin, which comes into contact with the septum. On lifting the margin with a director, the ulcerated surface is of a clean granular character without pus, blood, or other fluid. There is, and has been for some years, a slightly copper-coloured scaly patch on the left cheek. An enlarged but small gland lies under the corner of the left jaw, which she says is of recent origin. During the six years of these slow changes, the general health has remained fair. No mercurials or iodides in any dose, however given, or however prolonged, have had any effect. Several points of interest are seen in this case. On looking at the patient the first impression is that the peculiar, irregular, bulging nose, is the seat of malignant polypus. A sallow and somewhat cachectic appearance favour a view which further investigation negatives. The general elastic fulness of tissue around the gummy nodule, is probably of periosteal origin; in short, there is a diffused node of the nasal bones underneath and around them. We must bear in mind that the periosteum in health gradually *merges* into the adjacent connective tissue, hence chronic periosteal inflammation or node, also, is gradually merged in the continuous and similar, though looser tissue. I have several times seen gummatous masses seated in an indentation over a convex node.

It is very probable that the supposed polypi were gummatous protuberances, and quite unsuited for the ordinary treatment of simple polypi. The history of the treatment of the polypi is far from clear, but as all the syphilitic phenomena begin coincidently with the "polypi," the inference is fair. So unusal a measure as the introduction of a seton through the cheek (bony wall included) shows that the case was not one of *ordinary polypus*. It is unlikely that the operation was merely the exciting cause of the local manifestation of a latent constitutional disease,

seeing that clinical experience furnishes no ground for sup-
posing that the injury attending the removal of polypi
from the turbinated bones would give rise to periostitis of
the outer surface of the nasal bones. The improbability is
strengthened by the circumstance that the disease in the
interior of the nose is on the outer wall of the nasal
cavity.

A singular feature of this internal tertiary ulcer of several
years' duration is the entire absence of any discharge—
purulent or sanguineous. Does the close contact of the
ulcerated surface (of extreme chronicity) with the septum
give it a kind of subcutaneous character, and thus explain
the process of granulation without free fluids? If the teaching
of cellular pathology be true that the processes of prolifer-
ation, or granulation of tissue elements, short of suppuration,
go on under surfaces, the explanation is not unreasonable.

Another peculiar feature of the case, but which feature
is occasionally seen in other old syphilitic cases, is the entire
uselessness of remedies of any kind, in any doses, and for
any length of time. I well remember seeing this illustrated
in a pale feeble woman a little under middle age, with
old extensive specific ulcers of the tongue; the ulcers were
present for many years, and no kind or quantity of mercurials,
or iodides, exerted the slightest influence on them. In such
cases the treatment seems to be such regulation of diet,
and habits, and surroundings, as most tend to health.

The Diagnosis between Gummatous Disease and Cancer is not Easy.

Sometimes a fungous protrusion from the septum of the nose in
a middle-aged person, and perhaps attended with some hæmor-
rhage may reasonably give rise to fears of malignant diseases,
and yet be simply gummatous in its character. I have
seen such cases, and only watching for a time can give
us a certain knowledge of their character. Gummatous
masses when softened now and then leave *raised* margins—a
condition so frequently characteristic of cancer. In the tongue

I have reason to recognise this fact from a case at this moment under my care.

BUBO WITHIN THE ABDOMEN.

IN the Edinburgh Journal of Medicine (vol. iii.), I recorded a case to which the above title was, I think, correctly given. That the condition is rare there can be no doubt, as since that time I have not seen or read of any similar case. On describing the case in the presence of an able surgeon, he believed that an obscure case which he had seen was of a similar character. I do not know that any author has spoken of inflammation and suppuration of an iliac, or a lumbar gland arising during an attack of primary syphilis.

If I am correct in looking on the case here described as one of bubo within the abdomen, it is unlikely, however rare it may be, that it is the first case of the kind; when such cases have been met with they have probably been regarded as due to peritonitis, especially if no *post mortem* examination has been made, other cases may have been attributed to "simply coincident abscess," or in the female to "pelvic cellulitis."

It is almost needless to say that the lymphatic ducts pass from the cutaneous coverings of the external genital organs to the inguinal glands, from the inguinal to the external iliac, and from the external iliac to the lumbar glands. Now, in considering the following case as one of bubo it is presumed that in rare instances a lymphatic duct may wind its way between the inguinal directly to the external iliac glands. It is much less likely that the syphilitic poison would pass through the tissue of an inguinal gland without affecting it and then produce its specific effect on an external iliac. It is extremely unlikely that the lymphatic ducts are the only anatomical structures which are free from even striking abnormal deviations. If the internal carotid may arise from the arch of the aorta or be entirely absent, if the interosseous of the fore-arm may arise from the axillary artery, if the large nervous trunks which form the brachial, lumbar, or sacral plexuses may differ in number and conformation in every one

of twenty cases, why may not a small lymphatic duct pass one inch and a half further than usual, terminating behind rather than in front of the Poupart's ligament.

Benj. H., æt. 21, single, was admitted September 9, 1856, into the syphilitic wards of the Queen's Hospital. Here is the record of his case in part: with the exception of an attack of gonorrhœa twelve months ago, he has always had good health. For two months he has had sores on the inner lining of the prepuce. These are three in number, but are alike in size and shape; they are all healing; there is slight but very unmistakable induration underneath and around them. The inguinal glands are not enlarged. Eleven days ago he first noticed pain and tenderness deeply seated in the right groin; shortly a convex swelling followed. A few days before admission this swelling disappeared but was followed by increased pain and tenderness, as well as by sickness, rigors, and prostration; at the commencement of the abdominal symptoms he had diarrhœa, which ceased suddenly in a couple of days. Vomiting, which before had been occasional, became almost incessant twenty-four hours ago. He lies on his back with his thigh drawn up. The abdomen is distended, tense, painful, and tender; prostration is very marked and a daily record points to increasing prostration with distressing vomiting that became stercoraceous two days before his death, which happened on the 30th of the same month.

Thirty hours after death the body was examined. "Body much emaciated; rigor mortis present. The cranial and thoracic organs were healthy. On opening the abdomen the viscera in its lower half were seen to be covered with layers of lymph. This condition was more striking in the right iliac and hypogastric regions, so that in these sites coils of intestine were bound together in almost solid bundles. In the right iliac fossa, the intestinal folds were not only glued together but were glued also to the anterior wall of an abscess, which filled the greater portion of the cavity. Its lower limit was three quarters of an inch from Poupart's ligament; near its inner side was the external iliac artery; externally the abscess reached within two inches of the crest of the ileum; behind it

were the iliacus, psoas, and quadratus lumborum muscles. Running obliquely across the cavity, and isolated in the purulent fluid, was the external cutaneous nerve in its progress from the lumbar plexus to the anterior superior spinous process. In the upper part of the anterior wall, and not isolated, was the ilio-inguinal nerve. At the inner margin of the abscess, one inch and a half behind Poupart's ligament, one large lymphatic gland formed part of the wall of the cavity, the centre of the gland and much of its general structure were destroyed, the cavity and its ragged edges were turned towards the abscess. The small intestine in the vicinity of the suppurating cavity, though matted together and bearing a highly congested interior, was no where actually impervious. On the penis were the nearly completed cicatrices of three chancres."

In the light of the history, and *post-mortem* characters of the case, it seems not rational only, but difficult to do other than interpret the case thus : The young man contracted syphilis; an abnormally distributed duct carried the specific virus to an external iliac gland; the gland inflamed and suppurated; the resulting abscess invaded the adjacent connective tissue, and shortly set up peritonitis, and led indirectly to intestinal obstruction and death.

It will probably be admitted that the destruction of the interior of the external iliac gland was the result of an abscess, and that the abscess was produced by a poison carried by a lymphatic duct. I abstain, however, from any discussion on the disputed question of the relationship of the venereal lesion to the suppurating bubo. I presume, however, that no competent observer denies the occasional occurrence of the suppuration of a gland in conjunction with the true indurated chancre.

May we not here see the possible risk of a new and fatal danger in syphilis (and in gonorrhœa also,) remote it is true, but possible ? May we not also get another useful hint from such a case ? We may, perhaps, in a doubtful tumour of the breast find an enlarged gland in the posterior triangle of the neck, at the same time that the axilla is quite free. (See plate V. figs. 1 and 2.)

THE RELATION OF STRUMA TO SYPHILIS.

SEVERAL years ago I took great pains to enquire into the relationship (if any) between struma and syphilis. The question forced itself suddenly on my attention in this manner: I happened to have under my care at the same time, a few cases of extremely chronic ostitis (in one case in the trochanters, in another the lower end of the femur) in young adults, who were unquestionably the subjects of hereditary syphilis. The pressure of other work unfortunately deprived the enquiry of anything like completeness. The results I arrived at are to be seen in the *Medical Times and Gazette* for 1867. I still adhere to them in the main. The circumstance that they gained the approval of many surgeons, and of so high an authority as my friend Professor Gross, of Philadelphia, leads me the more to reproduce them in these pages, in a tentative and enquiring spirit.

A few queries will suggest the difficulty and obscurity which belong to this enquiry. Has struma any existence at all? If struma is a reality, what are its signs? What of the relations of struma and tubercle? I assume in the following observations that struma is a fact, and that its surgical manifestations are seen in certain slow forms of inflammation of cancellous bone tissue, in certain slow inflammations of the lymphatic glands, especially in the neck; in certain slow cutaneous ulcers, also found more frequently in the neck. I will give no opinion on the question of phthisis, except to note its frequent association or alternation with so-called strumous bone, strumous glands, and strumous cutaneous disease.

The nature of the relationship itself (if there be any) is by no means clear. Is struma merely a form of syphilis modified by transmission—a filtered syphilis altered in the process of filtration? Or is syphilis merely a state which encourages the development of struma—does one diathesis help on the other? or are the apparent relationships and combinations merely coincidences—coincidences the more common, because both hereditary syphilis and struma are also common diseases?

In investigating the antecedents of strumous cases, I have placed entire reliance on the remarkable discoveries of Mr. Jonathan Hutchinson, in the field of hereditary syphilis—especially the singly notched upper permanent incisors, the labial cicatrices, earthy complexion, and interstitial keratitis of puberty. But I further personally examined a great number of parents, and even grand-parents, and the historical information I obtained in this way corroborated, it seemed to me, the inferences now drawn. A circumstance which struck me forcibly was this : that where I expected to find syphilis in a parent, that parent was in many cases dead—death being unusually active in syphilitic families. As my enquiries were mainly in the direction of bone disease, I shall almost confine my remarks to them; but I shall at the same time regard them as representing a class of strumous diseases.

A young adult from fifteeen, or earlier, to forty, or later, complains of slow enlargement of the end of the shaft of a bone. It is common to find this mainly in the end of the diaphysis, the epiphysis and the joint frequently escaping any serious change ; the trochanters, for example, are slowly inflamed, but the hip-joint remains free ; the femur just above the epiphysis slowly enlarges, but the knee escapes. This is a curious fact. Long neglect, or an aggravation of the inflammatory process, or the close proximity of the epiphysis, as in the smallar bones, may lead to joint mischief; even then, when opportunity has offered, I have found the great bulk of the disease to lie on the shaft side of the epiphysial line. In short or irregular bones, vertebral, tarsal, carpal, or pelvic—the neighbouring structures are implicated at an earlier period. Whatever the cause of the osteitis of children may be, it is natural that the joint should be quickly involved, partly because the epiphyses are small, and the joints very near, and partly because the cell changes in the young are active, and physiological readily passes into pathological action.

It seems a fanciful conclusion to arrive at, but it has many times forced itself upon my notice, that struma

(especially slow osteitis) in the adult, is the product of syphilis in the parent, say father, and that struma in children is the product of the union of two persons both, or one strongly, the subject of hereditary syphilis. In late struma the fathers seem to blame, in early struma the two grandfathers. In some cases of struma, especially occurring between childhood and adult age, I have found evidence of acquired syphilis in one parent, and hereditary syphilis in the other.

To return to the osteitis of the young adult, the in-flammation is very slow; there is deep tenderness and pain, in some cases slight, in others severe. It may subside under favourable circumstances, leaving sclerosed bone, or it may proceed to molecular death. In the progressive cases, abscess in the adjacent soft parts, and sinuses, form not always after but frequently before actual caries or molecular death of bone. A circumstance of considerable interest in the treatment of these cases is, that if in addition to local measures, minute doses of mercury be given, the favourable progress of the case is distinctly accelerated.

At this point an important question may be asked. It has already been remarked that certain signs of hereditary syphilis have been accepted as reliable; but suppose that out of twenty cases, say two showed no signs of inherited disease, does it follow that the eighteen cases are cases of a curious coincidence merely, or is it not more likely that the common ordinary signs of hereditary mischief are absent in two? It has not been shown, and it is extremely improbable, that in every case of hereditary syphilis there are peculiarities of teeth, skin, lips and eyes. A node of unmistakeable character may occur in a child or young person, and yet there may be no other clear sign of hereditary syphilis. May not an osteitis likewise be possibly the sole indication of an inherited fault? In inflammation of the bones in children, in the spine, and in the joints, the fathers in several cases have volunteered to me a history of syphilis in themselves, but the spine, or joint, or bone ailment, has been the only evidence (presuming it can be admitted as such) of inherited syphilis in the child.

When so-called strumous diseases are combined, as phthisis and articular caries, or vertebral caries and joint disease, or several joints simultaneously, it will be found that the evidence of inherited syphilis is more than usually strongly marked.

Struma, we must bear in mind, is, in its local manifestations, merely a modified form of the inflammatory process, so also indeed is syphilis. Persons having constitutional syphilis, whether acquired or inherited, are certainly—on this point I speak very confidently—more than others prone to be attacked by inflammatory diseases. I have repeatedly seen this fact illustrated in cases of cellulitis, cutaneous or pelvic, or other; as also in erysipelatous and suppurative inflammations. It is not common for consecutive orchitis or injury of the testes to be followed by suppuration, but there are frequent exceptions to this rule in syphilitic persons. From cases which have happened within the circle of my own acquaintances, and also from others where I have had personal knowledge of the history, pneumonia is more than ordinarily frequent in syphilitic individuals. Not only does inflammation especially seize on syphilitic constitutions, but it is in them more ready to run on, sometimes with extreme rapidity, to suppuration in the deeper inflammations, and to destructive ulceration in the more superficial.

It may be said that many persons with well marked traces of hereditary syphilis go through life with excellent health. Unquestionably. But so do persons with marked struma; so do persons with gout. There is another explanation of this fact: infants with clear signs of hereditary syphilis are usually put through a mild but all-potent course of mercury. The extinction of syphilis, if it could be brought about, would in my opinion be followed by the disappearance of much struma, and many inflammations; and even if all infants born in what I may call syphilitic circumstances were carefully treated with mercury internally, or better, externally, I cannot but think some so-called strumous diseases, especially bone inflammations, would be more rarely seen.

THE VARIETIES OF ULCERS.

THE object of the present enquiry is to show, what has been before in some degree suspected of many, that all ulcers are the result of diathetic or constitutional states.

It is contended, moreover, that there are only *three* ulcers commonly seen; namely, the syphilitic, the eczematous, and the strumous. They are stated in the order of their frequency.

I speak of ulcers properly so-called; of those diseases in which a circumscribed loss of integument (its whole thickness) is the principal condition. There are many ulcerations which are not, and correctly so, classed as ulcers; such, for instance, are those which follow operations, injuries, abscesses, carbuncles, burns, escharotics, gout (with concretions), scurvy, chilblains, cancer, skin diseases, &c., &c. These ulcerations are secondary, and might not inaptly be called *contingent ulcers*.

The "varieties" of ulcers of our text-books are numerous, and, to deal with them impartially, it is perhaps best to resort to alphabetical justice. "Acutely inflamed," "cold," "cachectic," "exuberant," "eczematous," "gangrenous," "hæmorrhagic," "healing" or "healthy," "indolent," "inflamed," "neuralgic," "phagedænic," "œdematous," "senile," "scorbutic," "sloughing phagedænic," "sloughing," "strumous," "syphilitic," "ulcer of enervation," "varicose," "vicarious," "weak," are the names given by those writers who are at the same time both conscientious and perplexed. The majority of authors are content to give a few only, as the healing, indolent, inflamed, phagedænic, sloughing, and weak.

The observations of several years of hospital out-patients has led me to regard the peculiarities on which the ordinary classifications are based as merely accidental complications. Indolence, venous varicosity, hæmorrhage, inflammation, slough-ing, &c., are merely complications. They are not the essential conditions of the *origin*, or progress, or even the existence of any ulcer.

Nearly all ulcers are syphilitic, or eczematous, or strumous. The presence of syphilis is the essential condition of the *origin* and existence of one and the largest class of ulcers. If syphilis became extinct, the largest class of ulcers would also disappear. Eczema is essential to the *origin* and existence of another, and a numerous class of ulcers. If eczema ceased to exist, these also would cease to exist. Struma is essential to the *origin* and existence of another, but a much smaller class. I have thus, by anticipation, replied to the objection that syphilis, and eczema, and struma, are complications like indolence or inflammation, or hæmorrhage or senility.

Clinical observation has led me still further. A syphilitic ulcer, or an eczematous ulcer, may bleed, or be subject to neuralgia; they frequently become very chronic or indolent; they may be combined with varicose veins, or become inflamed even to destruction or sloughing. It is the syphilitic ulcer which is mainly liable to destructive ulceration. But, whatever accidental character or complication be super-added to the syphilitic or eczematous ulcer, it is rarely difficult to say which is syphilitic, and which is eczematous. Now and then "indolence" may be so marked, and other characters so little marked, that a very careful scrutiny may be needed to discover the syphilitic or eczematous origin and affinities. Excluding the small number of strumous ulcers, and the extremely small number of strumous ulcers on the legs of adults, I never see an ulcer which is not either syphilitic or eczematous, nay more, which is not more syphilitic than indolent, or varicose, or inflamed, or which is not more eczematous than indolent, or weak, or neuralgic. The accidents which form the basis of current classifications are not even common. Indolence and varicose veins are, it is true, not rare, but they are less common than the simple types of syphilitic or eczematous ulcers, while neuralgia, vicarious hæmorrhage, and tall granulations are decidedly infrequent.

Syphilitic, eczematous, and strumous ulcers may occur anywhere. The ulcers which occur on the legs of adults are, as a rule, either syphilitic or eczematous. The strumous ulcer is so rare after infancy and early adult life, and is

especially so rare on the leg, that I shall dismiss it and its well-known characters from this short enquiry. Eczematous ulcers are comparatively rare in the middle third of the leg, and very rare at any higher point. Not so with the tertiary syphilitic; they are not infrequent in the middle and upper thirds of the leg, near the knee, often over the patella (where the antecedent gummy products are often abundant, and the succeeding ulceration scanty and abortive), near the elbow and occasionally elsewhere.

It is in the lower third of the leg that the complications and accidents of ulcers, namely, indolence, inflammation, and so forth occur. It is here they are most frequent, here also, they are most obstinate. Here by coalescence and repeated sloughings, slight or severe, they often reach such a size that recovery is impossible, and they last for life.

Ulcers occur in the lower third of the leg, because there the circulation is feeblest, and the veins, deep and superficial, are little supported by muscular fibre; tendons here taking almost wholly the place of flesh. They occur mostly in the poorest classes and in the weaker sex. But the utmost poverty, *the utmost varicosity of veins*, exposure and standing occupations are all incapable of producing ulcers on the legs, if there be no constitutional syphilis, and no constitutional tendency to eczema. Given varicose veins and the circumstances which favour varicosity in a syphilitic or an eczematous diathesis, and ulcers on the legs are prone to follow.

Eczema is especially prone to occur on legs which are the seat of venous difficulties. But the eczema is the predominating feature (the veins co-operate or prolong); it will often pass away without ulceration; very often, also, it leads to ulceration. The eczema may almost completely disappear, but the ulcer remains. In some cases, however, the eczema will be seen in brownish, or reddish, or shining, or cracked, or scaly, or mottled patches, or as margins, or areolæ around the ulcers appearing.

In none of the three varieties of ulcers does inflammation play a prominent part, and the treatment, local or general,

for inflammation is of little service. Occasionally, however, acute and even destructive inflammation, as an accidental complication, supervenes on ulcers, especially the syphilitic. The complication (it is nothing more) is a curious one, and like many other complications demands for a time the first place in treatment.

It is not intended in this short paper to describe the syphilitic, or eczematous, or strumous ulcers. In the adult leg an ulcer which cannot be traced, by its characters, or attendant phenomena, or clinical history to syphilis, secondary or tertiary, may be very certainly put down as eczematous. It must not be forgotten, however, that the deep, tertiary ulcer is often a very late, and fortunately, often the last event in the history of syphilis.

The practical importance of a correct diagnosis in a case of ulcer is obvious. Treatment directed to eczema, or struma, or syphilis, instead of to indolence, or neuralgia, or weakness, or inflammation is often more successful than the ordinary treatment based on the ordinary classification. It may, nevertheless, be very needful to support the vessels by gentle compression to obviate the complication of indolence, whatever the origin or the essential character of the ulcer may be.

To summarise: in dealing with an ulcer we have to consider its origin, its characters and progress, its ending. Of these surely the origin is the most important. *Why did it begin?* Avoiding metaphysical subtleties, and regarding practical data only, we have, in any given ulcer, to ask what train of events led to it? These events or conditions mainly determine its character and progress. Strumous changes culminate in a strumous ulcer; eczema, and a cluster of incidents favouring its appearance, end in eczematous ulcer; a series of syphilitic lesions lead to syphilitic ulceration. Ulcers must exist before they can bleed or be indolent, or be inflamed, or be painful, or heal. All ulcers, for instance, heal; but to establish "healing" as the peculiarity of an independent class is to violate every law of reasoning.

Unusual Abscesses.

Curious abscesses from caries of the ribs.—Nothing is more instructive than to note the various localities, various forms, and various clinical histories of abscesses. I have lately seen two chronic abscesses in the abdominal wall, *both below the umbilicus,* which were unmistakeably due to caries of the ribs. In another case an abscess from caries of the ribs was single and in the vicinity of the inguinal canal, and had been diagnosed as a hernia. A chronic abscess from caries of the ribs, when of long duration (I have known them of twenty years' duration and upwards,) is often diagnosed as a fatty tumour. In another case there were the depressed openings of sinuses connected with nearly every rib of the right side.

An abscess with permanent opening and skin-like lining. —I once saw a young woman who had had an abscess just above the sternal notch, which had never healed in the ordinary way. There was a cavity the size of a large marble, and an opening into it the size of a sixpence. The deeper wall was near the trachea. It was lined with what seemed cicatricial skin, and what was certainly continuous with skin. It may have been the modified lining membrane of a sebaceous cyst—a cyst the suppuration of which constituted the original abscess. I thought it possible the cicatrising process had entered the cavity of the abscess, which had not healed in the ordinary way because of the constant movements of the trachea and its muscles. The interior of the cavity was too sensitive to handle freely, indeed the opening to the cavity only permitted the entrance of the tip of a small finger, and she strongly objected to any examination. The pale, thin, skin-like lining was very clearly seen, but was somewhat soiled with dust, which she would not take any steps to remove.

Pedunculated periosteal abscess.—About two years ago I saw a peculiar pedunculated enlargement on the outer aspect of the lower jaw, below and behind the last molar tooth. It was near the base and was hard, but I thought it yielded slightly to firm pressure. A grooved needle showed

it to be an abscess, and no doubt sub-periosteal in its origin.   It was not obviously due to any irritation in the adjacent dental sockets, which were apparently, simply and firmly healed over.   I say *apparently*, because the presence of a continuous gum covering is not conclusive evidence of a completely healthy alveolar socket.   The abscess was distinctly pedunculated, and it may be not unreasonable to infer that if an abscess with a stem occurs in connection with one bone, it may also in rare cases be found in others.

CLINICAL REMARKS ON THE ACTION OF COLD.

WHEN the minds of individuals and communities are intently inclined in one direction, it is natural that all matters in the one direction are exaggerated in importance, and that other matters are neglected, or are not seen. At present, and for some time past, individuals and communities have become almost monomaniacal on the question of ventilation. Mankind needs, it appears, fresh air only, and everything will be well. It is not enough to be much in the open air; doors and windows, and special apertures must all be constantly open. Indeed a wide-open window gives but a poor supply of air; air hesitates to enter a window as a fly hesitates to enter a spider's parlour. It is proposed to put a fan near all windows and so arrange machinery that recalcitrant air may be driven into every corner. As it is difficult to admit and to drive fresh currents of air in all directions without diffusing "cold" also, it is believed that cold is not injurious. We are all to become inured to "cool" rooms; we are not to neglect the "tonic effect of cold." Fortunately this is not the language of physiologists, but of sanitary engineers, and uncomfortable enthusiasts, and amateur physicians.

In popularising the laws of health it is well to teach not only the need for pure air, but the injurious effect of cold; cold with us is the most powerful, and the most frequent cause of disease. It is the one universal poison. Some poisons act on the nerves, some on the muscles, some on one structure, some on another, cold acts on all—kills all.

Of the two evils—impure air and cold—impure air is certainly the less, if we are compelled to choose between the two. Take railway carriages, not a single life was ever lost because the windows were closed; open windows have cost many hundreds of lives.

It is proposed here to draw attention to some of the evil effects of cold in surgical cases. It is a frequent cause of surgical ailments, it complicates many, it retards recovery in many. These clinical notes simply pretend to embody the results of my own personal observation.

In my experience erysipelas is essentially a disease of

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cold weather. Some other cause or causes, no doubt, in some cases, co-operate with cold, and their intensity may be so strong as to produce erysipelas in some cases independently of cold. But very frequently erysipelas will not prevail without cold, especially moist "raw" cold. The immediate appearance of erysipelas from direct exposure is not uncommon. A few winters ago, during *one* period of bleak and moist easterly winds of a few weeks duration, I saw more erysipelas than I usually see in a number of years. In one of the weeks I saw the following cases :—An adult man, in good health, the principal of a large healthy suburban educational establishment, on leaving a warm chapel, one Sunday evening, crossed a large quadrangle clad as he was during service ; the next day an attack of erysipelas of the head and neck set in so severely that he narrowly escaped with his life. The same Sunday evening, in another part of the town, a lady left church, passed through two or three streets, and complained bitterly of the cold when she reached home ; before the following Sunday she died from erysipelas of the head and neck. In another suburb a lady (in fair health), clad only in indoor clothing, gave directions to her servants out of doors in a very exposed spot ; a severe, though not fatal, attack of erysipelas of the head and neck followed. At the same time numerous cases were brought into the hospital, and some (not a disproportionate number) arose in the hospital. It was indisputable that the latter cases were found in the most exposed wards or parts of wards. It is a curious circumstance that in our detached wards, which are wholly protected from easterly winds by a large block of buildings, not a case of erysipelas has been known to *arise*, and this, notwithstanding that they are the wards to which all cases of erysipelas are taken.

In other parts of this volume will be found a description of gangrenous cellulitis around the rectum, and cellulitis of the neck. It will be seen that intense cold was a main factor in their causation. I feel sure that some cases of thrombosis and embolism, and also of icorrhæmia which I have seen, have been caused by ex-

posure to a low temperature. One case made a deep impression upon me. A fine, though rather large woman, between thirty and forty, was operated on for ruptured perinæum. In two or three days symptoms of thrombosis and embolism appeared, which were especially marked in the thighs; these dark hard masses were becoming gangrenous when death set in. Necessary exposure of the thighs (not suspected at the time) in an insufficiently warmed operating theatre was, I believe, the explanation of the unusual and sad result. Some of the surgical complications which occur in medical cases are certainly due to the action of cold. Of the two extremes in the treatment of fevers, big fires and closed windows on the one hand, and chilly room on the other, I should, if I had fever, prefer the former. One of my children had scarlet fever in a rather exposed country house during the month of March. She was doing well. There was copious mucous discharge from throat and nose, when a strong and biting east wind set in, and instantly, with every care, an abscess formed in each eustachian head, with such rigors and temperature as showed some septic absorption. A singular incident happened bearing on the question of counter-irritation : the mucous discharges all ceased the moment the abscesses formed. Here were cause and effect, not a mere coincidence. A family (in the country) of five children, had scarlet fever during a severe frost and snow. The family adviser, although a shrewd man, forgot, as "ventilationists" are apt to do, the effects of cold in his determination to have "fresh air." Some of the window frames were taken out, and thin calico put up in place of glass. The children who were first convalescent were immediately put into a perambulator and taken over gravel walks covered with a thin layer of snow. The results were calamitous though happily not fatal. Large, multiple, subcutaneous abscesses appeared in three of the four children. The abscesses were the largest in extent I have ever seen. They appeared in the limbs and neck. One lad of ten had in one lower limb, the left, an abscess which extended from the gluteal fold to the popliteal space, and a second which stretched from

the upper border of the calf to the ankle, and both of them reached half way round the limb. The closing of these abscesses caused lameness for a time which gradually passed off.

In an ailment so apparently diathetic as gout, cold would be expected to play a minor part; yet, in the person of one of my intimate acquaintances, it is quite otherwise. His gout is of a minor character, taking the form of langour, restless nights, and eczema, and only occasionally of pain and redness in the great toe. The basis of the gout is apparently feeble action of liver and stomach, but the feeble action is so much influenced by colds, that he declares if he never caught cold he should have no gout. He is singularly sensitive to cold, and each cold produces a red patch on the nose; before one patch is well another frequently comes, so that he can often count the number of recent colds by the number of red spots on the nose. The spots are not due to alcohol, for he is from necessity and choice an entire abstainer.

To return from this deviation on the effects of cold in certain medical states which have come under my notice in my own family, or intimate circle of friends, I close these notes with a brief remark or two on the aggravation of other surgical ailments by cold. This is especially noticeable in diseases of the urinary tract. Cystitis and urethritis, and all the sequelæ of stricture, tight phimosis, small meatus, or enlarged prostate are in many persons clearly increased in severity in cold weather. More than this, a few individuals *with no local disease* are liable to have cystitis when the cold winds of Spring blow. The steps are these :—first, bleak cold winds, and probably lessened clothing, then impaired action of liver and stomach, then highly acid urine, then cystitis with frequent and painful micturition. Occasionally a decided urethral discharge and scalding will appear, and such cases are frequently called cases of gouty urethritis; sometimes the · gouty state is clear, in others it is less clear, or remains solely a vesical or urethral ailment. This "spring cystitis," as I sometimes call it, is of course all the more readily induced if there exist any co-operative cause however slight it may be, any, even apparently trifling, impediment at the prepuce, or meatus, or urethra, or prostate gland.

THE PROBABLE DIMINISHING FREQUENCY OF SURGICAL OPERATIONS.

For several years I have been leaning to the opinion that the amount of surgery, and especially of operative surgery, in proportion to the population is growing less and less. The diminution is probably relative, not absolute. It occurs within definite limits, at least it does not affect equally all branches of surgery. But curiously enough the general range of surgery has extended, notwithstanding that its relative totality has diminished.

What are the grounds of this opinion? Let me first say, it is founded generally on no slight effort to discover (avoiding suggestive or leading questions) what is going on in hospitals now, and what went on ten and twenty years ago. I do not go backwards more than twenty years because I wish to speak of those things only which I have seen. I have carefully weighed the views, reports, and papers of hospital surgeons; I have listened to the statements of many hospital surgeons whose observing powers, memory, experience, and reputation are unquestioned; I look at the character of the cases which now fill hospital beds, and I recall the cases which filled the same beds ten years ago and twenty years ago.

Let me speak now of the grounds which I have avoided. I have not looked at private practice, which is based purely on personal qualities, and which grows or fades on quite personal grounds. I have rigidly disregarded my own experience, both hospital and private. I have—this may seem singular—drawn up no statistics. I give none; why, I shall say shortly.

Let us listen to a representative, cultured, but imaginary surgeon. He says: "During the last twelve months I have had in hospital practice fewer amputations and excisions of joints, fewer strangulated hernias, fewer lithotomies, fewer punctures of the rectum or other operations for retention of urine. Ten years ago I had a larger number of each

of these operations; twenty years ago a still larger number. The character of my surgery is changed. It has no less, perhaps, of diagnostic care or operative precision; but it has more of habits, of hygiene, of dressing, of mechanism. I am rather an artist in sticking plaster, pulleys, plaster of Paris, spray-producers, and injecting and exhausting syringes, than a master of the catlin, the saw, or the gorget. My operations are changed," the ideal surgeon goes to say, "I am aspirating serous effusions and deep abscesses in the cavities. I am operating for meningocele and spina bifida. I excise bronchoceles, inject the substance of numerous growths in various localities. I am not less bold. I open the abdomen for diagnosis. With Listerian precautions I open cavities and joints, and make exploratory incisions. I open the abdomen for many operations; if things do not go on well after an operation, I re-open it to see what is the matter. I make the incision of lithotomy as the best drain in rupture of the bladder, and for other diseases than calculus. I excise the spleen, or kidney, or larynx. I cut a calculus from the kidney. I stretch the brachial plexus and other nerve trunks. I saw through the neck of the femur subcutaneously. I use the saw or chisel through other bones. If I cannot, in certain cases, pass an instrument through a stricture from before backwards, I make an opening in the urinary track, and pass an instrument from behind forwards. In prostatic retention, where no instrument can be passed, I open the membranous urethra and feel my way into the bladder, and if I cannot do this, I puncture the front of the bladder from the perinæal wound. I crush and remove at once large calculi. Thus my experience teaches me not only that the relative amount of surgery is less, but that its quality is altered, and that its range is wider, and that it is still extending."

Our ideal surgeon has still a few more words to give. He says:—"My instruments are changed. A few years ago I lopped off big limbs with a few instruments in a lady's reticule. Now I am in danger of needing a waggon to carry spray producers and antiseptic wares generally, an electric écraseur to remove a cherry-sized nævus from the tongue, or

a rack aspirator to remove a teaspoonful of pus from the broad ligament."

The rising surgeons are different. In pathology progress is slower, for, as is seen in the origin of cancer say, or in the influence of germs, many surgeons are still subtle metaphysicians; others in practice aim mainly to be superior dressers and ingenious mechanists.

A few minutes ago I said I had no statistics to offer; let me offer an explanation. Statistical enquiry in the inexact sciences has misled as often as it as led. There are more avenues for errors to creep into statistics than there are avenues for errors to creep into the opinions of trained observers. If six competent surgeons tell me one thing, and the statistics of six hundred hospitals tell me another, I believe the six surgeons. If experienced surgeons tell me they see as much (proportionately) erysipelas and pyæmia in private practice as in hospital practice, and that the worst cases of erysipelas are brought into, and do not arise within, hospital wards, I refuse to believe the statistics which call it a hospital disease.

Errors so readily creep into both opinions and statistics, that it may not be without profit to look at a few examples.

In any given large town there are, at a certain period, one or more general hospitals; then an eye hospital arises, altering a little its practice and statistics. Then a children's hospital, or a women's hospital, or a skin hospital, or an orthopædic hospital, or a lock hospital, change the practice and the statistics very materially. These, and dispensaries, workhouse infirmaries, new hospitals in smaller country towns, affect not only the kinds of cases, but the degree of severity of all cases which enter the general hospitals. Let me cite another element, among many, which affects hospital figures. It is the varying character of the reputation and energy of the hospital staff. One surgeon or staff of surgeons is active, informed, and conscientious, another surgeon or staff of surgeons is less informed and indolent. In one decade operations are numerous, in another there are, practically none. One surgeon finds in his cases many in which an operation relieves or saves life. Another surgeon never finds suitable cases

for operation. "To day," he says, "it is too early to operate, to-morrow it is too late." I do not speak of any particular hospital, or kind of hospital; but of all sizes and sorts everywhere. But what of the value of statistics in such cases? For reasons here suggested, and for others too numerous, complicated, and wearisome to refer to, I give a higher value to the opinion of capable and widely-seeing men than I do to figures.

I have said that decrease is not visible along the whole line of operative surgery. Some operations are diminishing in frequency, some are not; some are increasing, some are going out of use, some are newly coming in.

In no branch of operative surgery is a decrease so marked as in amputation. Police and other supervision prevent the gangrene of the feet that occurred when drunkards and idiots slept out-of-doors in winter nights. Drunkenness itself is diminishing. Smashed limbs, though still too frequent, are less common now that machinery is better protected and explosives more carefully stored. Syphilis is less severe and better treated—indeed, I believe with Hutchinson, it is often cured—hence there is less of struma, of disease of bones and joints in the second and third generations. I will not affirm that it is so; but less syphilis may mean less aneurism, and less need of the ligature of large arteries.

There are fewer strangulated hernias, because hernias are better looked after and better trussed. In the large field of rectal diseases there is a less apparent decrease of operative need. A more educated public is more anxious about its ailments; but it will not give up its wine altogether, and it will be sedentary.

The lithic acid diathesis is treated at an earlier period. Or if a calculus form, it is chiefly among the ignorant, a dwindling class, that it is allowed to grow so large in adults as to need to be cut out. Strictures are strikingly better cared for than formerly. There are no surgical instruments that have been so denounced as elastic catheters and bougies, to my mind there are no instruments that have saved so many lives. The occasional use by the patient himself of a bulbous

pointed conical elastic bougie has, within my personal knowledge, saved a goodly number of severe and often fatal operations.

I turn now to those branches of surgery in which there is an increase in the frequency and in the number of operations. I shall again take my illustrations from the surgery common to all the organs, from the surgery of the bones, the joints, the great vessels, the digestive tract, the respiratory tract, and the genito-urinary tract.

The fact that stands out most prominently is the frequency and the utility of aspiration. It is standing the test which not every, even good, operation can stand—the test of reaction. Its exaggerated use has not dwarfed its real use. Its benefits might, in my opinion, be still more general if we were to adopt in some cases gradual or gentle aspiration—to put in, say in the cavity of the skull, in a meningocele, or in spina bifida, the needle first, and then create a vacuum very slowly—a method the reverse of that which is commonly practised and which Dieulafoy teaches. If, as we have reason to hope, injection into the substance of organs turns out to be a real gain to surgery—enlarged thyroid, enlarged glands, nasal polypi, enlarged prostrate especially, as a very fatal ailment, offer a large field for its use.

In the bones, section, or excisions of slices or wedges, giving new positions and new uses to limbs, are increasing in number, and are most valuable operations, so is trephining in, not abscess only, but continued osteitis of different kinds in various bones.

The possibility of opening joints safely under antiseptic conditions is a recent and striking feature in the surgery of to-day. This would be a great boon if antiseptic surgery had done nothing else. The reduction of old dislocations, the lessened use of pulleys in dislocations generally, the rupture of adhesions by flexion are more and more in favour.

The surgery of the larynx may claim to be almost a new branch of surgery. The removal of growths from the interior of the larynx through the natural passages, thyrotomy and excision of the larynx mark an epoch in the surgery of the

respiratory organs. While I revise these pages a report comes from Germany of excision of the pharynx. Probably *some* of the operations which generally come into notice will as quickly disappear.

I can do little more than mention the increased numbers, the difficulty and the complication of operations in the surgery of the genito-urinary organs. However numerous, difficult, or complicated such operations may be, they must be mastered by those who undertake the responsibility of this branch of surgery. When I look at the serious—often fatal results of stricture, its varieties, the operations for its treatment, the number of instruments that may be used, and the grave results which often follow stricture operations, I often wonder that surgeons and the public could ever have believed, or can now believe, that gonorrhœa is a trifling disease. I affirm, in the simplest and the strongest language I can use, that, *in the surgical wards* the clap kills more men than the pox. I cannot say that I believe gonorrhœa to be less frequent than it was, but I am glad to be able to believe that its later, indirect, and worst results—retention and the severer operations adopted for its relief—are less frequent —certainly less frequent in proportion to the population.

There is another class of operations more melancholy to reflect upon, which keep pace with the population, and the prospect of lessening which is at present gloomy. They are the operations for maladies which men, so far, cannot check or diminish—operations for hydra-headed cancer, for ovarian cysts, for morbid growths of every kind, for the grievous deformities of club-foot, for wry-neck, for squint, for hare-lip, for cleft-palate, for epispadias, hypospadias, and extro-version of the bladder.

I am not sure that from some new operations there may not be a re-action as there has been in the case of the radical cure for hernia. A truss is better than a serious operation. False noses and false palates may come more into vogue than operations for absent nose or cleft-palate. If surgeons could put teeth into the natural alveolar socket the dentist's mechanism would still be preferred.

If there be a decrease in the sum total of operative surgery, what has caused it? Higher education of our profession and higher education of the public. Less eating, less drinking, less syphilis, more care of limb and life in every way. Greater attention to hygiene, clothing, food, air, warmth, diet and exercise. Where men's folly and neglect have caused diseases, men have striven to relieve them. Unfortunately, where nature (so-called) has sent the diseases, men have been powerless to check. Men save men; nature kills men.

We may unreservedly congratulate the public that, through our exertion, it rests its inflamed bones and joints before it is too late, it puts a truss on its hernia before strangulation comes on, it keeps its stricture pervious, and avoids retention.

I hope I am not alone in the opinion that there is a gradual diminution in the total of operative surgery. If there be no real though relative diminution there ought to be, or we must speak less of the great work we profess to be doing.

PART II.

ENQUIRIES IN THE SURGERY OF THE HEAD AND NECK.

CLINICAL LECTURE ON A CASE IN WHICH THE TREPHINE WAS
    SUCCESSFULLY USED FOR A PUNCTURED FRACTURE OF THE
    SKULL; AND ITS BEARINGS ON THE RULES FOR TREPHINING.

THE remarkable case before you, in which life and intellect
were clearly saved by the use of the trephine, offers a
convenient opportunity for taking a general view of the
utility of trephining.   This young man, B. D. (aged 20),
was awaiting his turn to enter a theatre when a slate
from a roof (forty feet high) fell on to his head and
severely injured it.   He walked to the hospital next morn-
ing with a scalp wound a little above the middle of the
right parietal bone, which contained brain-substance, and
which was affected by respiratory movements.   Examination
brought to light a compound, cut, comminuted, and depressed
fracture.   There was marked hemiplegia on the left side,
more especially in the forearm and hand and in the ankle and
foot.   The tongue when put out was directed to the left
side.   He was taken into the hospital, and within an hour
the trephine was used.   Eight pieces of bone were removed,
varying in size from a little less than a sixpence to a
little larger than a shilling, with, in addition, a strip of
felt hat and a separate strip of paper lining, both the
width of an ordinary blue slate, and an inch in length,
and both deeply embedded in the brain-substance.   (See
Plate V., Fig. 3.)   The soft parts were lightly adjusted
without stitches, or strapping, or pads, and directly covered

with a sponge which was kept constantly moist with terebene and water. Occasionally the ragged brain surface was gently moistened with pure terebene. For several days there were frequent paroxysms of clonic spasms on the left side. He lay on the left side with his knees drawn up. After a few days hernia of the brain appeared, which was left to gentle antiseptic sponge-pressure and the later cicatrising forces. His recovery has been favourable, and he will shortly leave the hospital.

Having put together the salient features of the case, we will now review them with such comments as may point to the lessons they teach. The steps of the operation of trephining need not detain us now. The instrument was, of course, fixed on a sound margin of bone. The fragments were removed with the utmost gentleness, but a firm hand was needed for some fragments, and other fragments were seated very deeply. The inner table of the skull, as is the rule in fractures made by pointed, or edged, or sharply cornered bodies, was more extensively broken than the outer. An irregularly oval gap running forwards and downwards, and lying mostly behind the line drawn from ear to ear, was left in the upper half of the right parietal bone, measuring about two inches in length and rather more than one in breadth. The membranes were much torn. As much blood-stained brain and blood clot as would fill a walnut-shell escaped before and during the operation. The depth to which the brain-substance was injured must certainly have exceeded an inch. The bit of felt hat was quite an inch deep in the brain, and only the trephine disclosed its presence. The not improbable existence of foreign bodies in punctured and other compound fractures, where the meninges are pierced, is an additional ground for trephining. During the few days which followed the operation he vomited occasionally. For several days the left arm seemed quite powerless. The clonic spasms diminished in frequency, and ceased on the fifth or sixth day. The pupils were not affected. He never lost his consciousness, but during one or two nights there was slight wandering. His temperature varied from 99° to 101°.

His pulse came down from 120° on the second day to 99° on the third day. Except the hernial protrusion there were no signs of inflammation or other change in the wound. Having described his condition during the first few days, I will briefly summarise the weeks of his recovery. The brain-surface granulated cleanly, the corners of the scalp smoothed down, and the hernial protrusion gradually subsided as the cicatrising margins closed over it. Look now at this scar. The former hernia has become a deep depression—a fortunate depression, as it is his best protection against injury. The scar is thin, and consists of the membranes of the brain and the scalp tissues, which have merged into one common layer of connective tissue, over which the epidermis of the neighbouring skin has grown.

On three occasions during his convalescence we were made uneasy by a temporary rise of temperature. On the third occasion the thermometer reached 104°, and was attended with great listlessness. The formation and the confinement (one or both) of a few drops of pus in or near the thin scar and under a small scab explained these alarms.

We will now look at the paralysis. From the first day, the tongue when put out turned to the left. The condition of the upper limb has all along improved, and at present the impaired movement is chiefly seen in the forearm, wrist, and fingers; the power of supination and pronation is very feeble in the wrist and fingers; flexion is enfeebled, but extension is much more so. In the lower limb flexion and extension of the knee are not much affected; but the extensors of the toes, which are, I need scarcely say, also the flexors of the ankle, are much weakened. The heel is slightly elevated, and when he first began to walk he threw the lower limb forwards with a kind of semicircular outward swing; gradually this movement has become more of a jerk, such as is seen in the slighter forms of equine talipes which are left after infantile paralysis. His water required to be drawn on one occasion only, on the third day.

With all this favourable recovery I must not conceal from you the fact that his future is not altogether an unclouded one. When I stated the chief facts of the case to

perhaps the most eminent English authority on nerve path-
ology, he expressed a fear that our patient would some
time become the subject of one-side-beginning epilepsy.
The young man, who is naturally of a quiet, simple, good-
natured temperament, is thought to be a little, but only
a little, less mentally capable than he formerly was.

The dressing you have seen used in this case is worth
your attention and criticism. From first to last a very soft
Turkey sponge constantly moistened with terebene-and-water
was kept with gentle pressure upon the wound. It took
up a little serum and blood at first, and afterwards a few
drops of healthy pus. Nothing remained or decomposed in
the wound. Any attempt during the process of repair to
substitute oiled lint or other dressing was uniformly followed
by some fœtor in the wound, and as uniformly by some
rise of temperature.

Our patient you see is well, yet recovery in such cases
is rarely seen. It is very likely that several circumstances
contributed to the fortunate result: the patient is young;
he has an unexcitable nervous system—a most important
factor in shock or in inflammation; the operation was done
quickly, before inflammation of brain or membranes could
set in; the gentleness in every step of the operation and
the character of the dressing had also their share of
influence.

Let me now say a few words on the general question
of trephining. In one lecture we cannot at all fully review
the subject; nevertheless, advantage must be taken of single
cases to throw light on general principles. There is one
law touching the use of the trephine about which there is
no difference of opinion. Being an important, clear, and un-
disputed law, it should, I think, be put first and separately;
our case falls under it. In cut or punctured fractures
where there is necessarily a scalp-wound, where the meninges
are pierced and bits of bone stick in the brain, whether
there are "symptoms" or "no symptoms," trephine im-
mediately. It is true our young man had some hemiplegia,
but if he had had no hemiplegia the treatment would have
been the same.

PLATE V.

Figs. 1 and 2 show clinical bearings of abnormal distribution of lymphatics.

Fig. 3 shows a "cut fracture" with portions of felt hat deeply embedded in the brain.

Fig. 4. A case of destruction of entire scalp, and apparent death of outer table of skull.

Figs. 5, 6, and 7, suggest a method of excising large cancers from the face.

PLATE V.

Fig. 1.

Fig. 2.
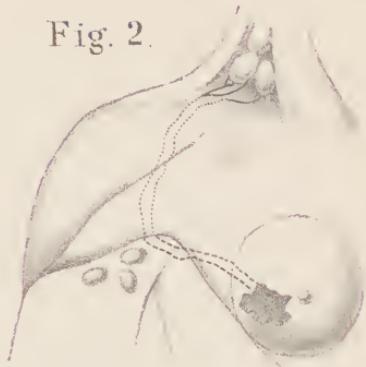
Fig. 3.

Fig. 4.

Fig. 5.
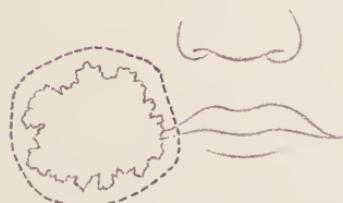
Fig. 6.

Fig. 7.
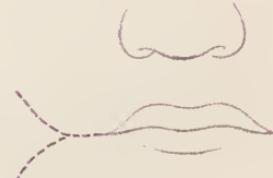
I have just used the word "symptoms." Let me say here and at once what we mean by "symptoms," and the equivalent expression "symptoms of compression." There is a multitude of anomalous and very momentous phenomena, also, which do not concern us now. We do not speak of shock, or insensibility, or vomiting, or local paralyses, or partial paralyses, or convulsive movements, or restless flexion movements, or delirium, or fever, or high temperature, because we are not speaking of stunned, or bruised, or torn, or inflamed brain. By "symptoms" we mean a clear and persistent *paralysis* of one side of the body. This hemiplegia is usually associated with coma, and both are due to undoubted pressure on the brain—pressure of bone, or blood, or inflammatory products. I am in the habit of using brief phrases to denote the varieties of compression of the brain, with their hemiplegia, and coma, and perhaps stertor and whiffing of the cheek. The expressions "paralysing bone pressure," "paralysing blood-pressure," "paralysing pus-pressure," seem to have the merit of combining definition and diagnosis. Let me remind you that paralysing bone pressure appears instantly with the injury, that paralysing blood-pressure comes on in a few hours with reaction, and that paralysing pus-pressure comes on after a few or many days with high temperature and fever.

In this lecture I desire to deal with leading principles chiefly, and also more particularly with those which bear on fractures of the skull where there are perforating bone fragments or paralysing bone fragments—in short, on the position, characters, and probable effects of broken pieces of skull. A number of minor details cluster round the leading features of head injuries. I scarcely regret that I am forced to neglect them to-day. When the anxious moment arrives of action or no action, he is the fortunate man in whose mind essential principles come to the front undimmed by relatively unimportant details.

The when-to-trephine propositions of authors embody much difference of opinion, but as they reflect our present knowledge it is well that I should bring them before you; and remember they relate to the adult skull (with its diploë and laminæ) only.

M

In simple depressed fracture with symptoms—trephine; in compound depressed fracture with symptoms—trephine; in compound depressed fracture without symptoms—some surgeons trephine, others do not; in punctured and cut fractures, with or without symptoms—trephine; in fracture followed by hæmorrhage from a meningeal trunk, with symptoms—there is much difference of opinion; in fracture followed by symptoms of pressure from inflammatory products—there is also great diversity of teaching; in the remoter irritating sequelæ of fracture, epilepsy especially—trephining has hitherto been very rare.   Indeed, as a matter of fact, trephining is rarely resorted to, either for paralysing blood-pressure, paralysing pus-pressure, or for the later results of fracture.   We naturally expect that opinion and teaching vary where the problems they deal with are extremely obscure.   The locality of the head-injury, its characters, its extent, its implication of adjacent parts, its complications, its accessibility, the possibility of removing the causes of "symptoms," are matters so grave and enigmatical as to tax the most instructed and experienced judgments.   The judges also are not alike.   Here is one who takes a sanguine view of cases, and trephines frequently; there is another who takes gloomy views and never trephines. One class of teachers I warn you against—namely, those who in ambiguous matters dogmatically lay down laws as if there were no ambiguity and no difference of opinion.   For example, one authority says: "In suspected clot between the bone and dura mater, even if there be no wound and no sign of fracture, trephine over the meningeal artery."   He gives no hint that others not only differ from him, but go so far as to contend that even if there are signs of a fracture and a wound, as well as evidence of such a clot, it is undesirable to trephine, because the coagulum is so diffused, so difficult to remove, and so frequently dips into the base of the skull.   In surgical affairs, gentlemen, as in all the affairs of life, your opinions need not be the less strong because you clearly see, fairly state, and justly appraise opposite opinions.

Strictly speaking, there are only two principles touching the operation of trephining on which surgeons are agreed :

trephine in cut and punctured fractures, and trephine when depressed bone causes hemiplegia and coma. In the several injuries of the head which destroy life in different ways and at different times I wish it were possible so to strip off collateral and minor circumstance, and so to strip off controversy, that the trephining formulæ might be simplified and reduced in number. In cases of paralysing pressure—of bone, or blood, or pus—possibly increasing knowledge will enable us to adopt, say, this proposition in lieu of several: trephine in hemiplegia and coma when they are the results of traumatic causes which can be known in time, be got at, and which can be removed. The operation of trephining is, no doubt, in itself a very serious wound; but in performing it we hope to change a fatal into a serious wound—a hopeless wound into one not hopeless.

I go on to look, from a point of view suggested by my own experience and reflection, at the classes of cases in which the trephine must or may be used. And I cannot but think that the order of such classes should be mainly decided by the urgency and the clearness of the need for operative action.

The first class of cases in which the trephine should be used stands alone—the " perforating bone " class. Symptoms are not considered. Cut and punctured fractures are necessarily compound, and fragments piercing the membranes lead to most serious results. I think it would simplify classification and improve treatment if this class were made more comprehensive. It is not desirable to look merely at the sharpness of the edge or point of the injuring body, but at the nature of the fracture. Was the body which broke the skull *sharp enough* or *pointed enough* to drive bits of bone through the membranes into the brain ? The importance of this question we shall shortly see. Detached pieces of bone are practically foreign bodies; but other foreign bodies in cases of fracture with perforating bone or paralysing bone, occasionally need to be removed.

The second class is that of paralysing bone pressure (whether the fracture be simple or compound is unimportant) where hemiplegia is unequivocal and persistent. Another class,

if it can be called a separate class, is that of depressed and
exposed bone without paralysis—the "compound depressed
fracture without symptoms." Here teaching differs greatly.
Here also is seen the pertinence of the question I have just
put—Was the injuring body so edged, or pointed, or cornered,
that the in-driven fragments pierced the meninges? If they
were, why not put these cases in the first category—viz., that
of punctured fractures? One of three things will happen in
compound fracture of the skull: the broken bone presses and
paralyses—if so, trephine; or the broken bone perforates the
membranes—if so, also trephine; or it will do neither, and
no operation is needed. In other words, exposed and even
depressed broken bone may neither perforate the membranes
nor cause paralysis by pressure. Remember that I am not
describing all the injuries, or indeed all the fractures, of the
skull now; I confine myself to those which involve the
question of trephining. With respect to these compound
depressed fractures which do not paralyse, I would, discarding
the terms "cut" and "punctured," or giving them a larger
meaning, at least suggest this guiding principle: lean the
more to the use of the trephine the more reason there is to
suspect perforation of the dura mater. Whether the dura
mater is injured or not is all important. There may, however,
certainly be some degree of indented and depressed bone
without either laceration of membranes or paralysing pressure. In
deciding this point the degree of inclination, size and shape
of the fragments, the presence or not of brain-substance in
the wound, and the gentle use of a fine probe, will give
us great help. In otherwise doubtful cases Sir James Paget
gives a valuable suggestion: the trephine can be more
easily dispensed with in the earlier than in the later half
of life.

A third class is that of paralysing blood-pressure. Here, after
a fracture has torn a meningeal trunk, effusion between
the bone and dura mater comes on in a few hours with re-
action, and, if abundant, leads to paralysis of the opposite
side. If I were at hand when hemiplegia and coma where
clearly coming on after an interval of consciousness, I

should seriously think of tying the common carotid on the injured side. Later on I should side with those surgeons who in desperate cases would trephine at the fractured fissure (as it may only be), and who, if no wound were present and no fracture could be found, would make an exploratory incision in search of it. If we do not remove all the clot we may so increase the capacity of the skull-cavity as to give sensible relief. In this as in the other classes of cases needing the trephine we are certainly justified in regarding the operation as a different and a safer one when performed under antiseptic precautions. With such precautions I should venture to remove bone more freely in the attempt to remove clot.

The fourth class is that where there is paralysing pressure from inflammatory products. Of all the cases were it is proposed to use the trephine these present the greatest difficulties—difficulties touching the locality, extent, complications and results of the inflammatory process. Even an " opposite hemiplegia," a defined fracture, and a puffy tumour are uncertain guides, and the operation can only be advised in quite exceptional cases.

The fifth class of cases, where there are later sources of irritation leading to epilepsy and enfeebled intellect, is one where, with antiseptic dressing and clearer diagnosis, there is a prospect of the more frequent use of the trephine. While I revise these notes my colleague, Mr. West, has in the hospital a case which strikingly demonstrates the utility of the trephine (with Listerism in his case) in hopelessly progressive epilepsy. The case was under the care of Dr. Heslop, who suggested the propriety of operative relief.

Thus we have some nearly half-dozen cases in which the trephine may or must be called for : when bone fragments clearly perforate, when bone-fragments hopelessly paralyse, when blood paralyses, when pus paralyses, and when at a later period bone fragments irritate. These classes may further be said to fall under three leading principles which regulate the operation of trephining—namely, where pieces of bone pass through the meninges and enter the brain, where there is paralysing pressure of bone, or blood or pus, and where later sequelæ threaten intellect and life.

Let my last remark be to remind you that antiseptic methods of treatment promise to have important bearings on the operation we are discussing, and to greatly widen the sphere of its utility.

On Ligature of the Common Carotid in Rupture of the Middle Meningeal Artery, from Fracture of the Skull.

In a preceding clinical lecture on the principles which should guide us in the use of the trephine, the question of paralysing blood pressure was briefly touched upon. I there stated that if I were at hand in a case of clear meningeal hæmorrhage, in which unequivocal hemiplegia and coma were becoming more and more apparent, I should seriously consider the propriety of putting a ligature on the common carotid artery. It is no doubt quite true that opportunities for such a proceeding—a clear diagnosis and an operating surgeon within reach must be very few; but they do happen and are understood in hospitals where the resident officers are intelligent and on the watch.

The diagnosis cannot be regarded as clear where the symptoms of concussion, laceration, bruising, arachnoidal hæmorrhage, or cerebral hæmorrhage, are unusually severe, or prolonged, or mixed, even though there are signs of external injury in the vicinity of the meningeal vessels. Yet there are a few cases of injury to one side of the head where the symptoms of concussion (if present) pass away quickly; an interval of consciousness and freedom from any kind of paralysis follows; then, in a variable number of hours from the injury, when reaction comes on with flushed face and fuller pulse, incoherence of speech, drowsiness, a tottering walk or inability to stand, plainly show the onset of coma and hemiplegia. The symptoms at this stage strongly resemble the state of intoxication.

The application of a ligature to the carotid artery on the side of the injury would appear to be altogether a less serious operation than that of trephining. It would probably not merely arrest the hæmorrhage but, by checking the

arterial circulation generally on one half of the cranial cavity, it would likewise lessen the effect of the pressure already effected.

The ligature has another advantage over the trephine under the circumstances : if there be an error in diagnosis, if the hæmorrhage be not from a meningeal trunk, but from some other (arterial) source, the ligature would be still of use, while the trephine would not.

A Case of Apparent Death of the Outer Table of the Skull followed by Recovery.

The death of bone—for so it must be regarded in this case—did not follow periostitis, but a severe burn. An Irish labourer fell, while in an epileptic fit, with his head against the fire. The scalp was entirely destroyed and the pericranium also. He lingered in a workhouse infirmary a long time in a miserable bed-ridden state, and was then put under my care. I found the whole skull above a line drawn from the eye-brows to the occipital prominence entirely denuded, and the bone (the outer table at least) of a dead dull brown colour. The soft parts were thickened and so detached that a sulcus extended around the calvarium, and contained decomposing pus. (See Plate V., Fig 4.)

With little expectation of doing any good, I directed the principles of treatment to be these : perfect cleanliness, broad and long strips of lint to be moistened with tere-benised oil, and so applied as to draw up the everted margins of the scalp along the surface of the "dead" bone. The bone to be kept covered with the same strips, and a layer of cotton wool and a suitable bandage to keep all in place. The results were striking. Not only did the whole circumference of the soft parts at once adhere to the "dead" bone, but it sent up all round a broad margin of granulations. In many places the granulating margin shot up promontories which here and there expanded into islands with isthmuses. After a time the method of skin grafting was adopted with great benefit; for while granulations shot

up everywhere with great rapidity, the epidermic covering followed much more slowly. In the course of a few weeks nearly the whole of the calvarium was covered, but an irregular oval patch about the size of a florin, was left over the sagittal suture. This patch was confined to the outer table as was clearly seen by the process of detachment by a deepening circle of caries. His general health in the meantime became good. He resumed self-helpful and active habits. Before the thin plates of bone were entirely separated he returned to the parochial infirmary; but, I am informed, he continued to do well, and very shortly went back to Ireland.

The bone here was I believe dead; but not so dead but that the contact with it and growth over it of granulation tissue restored its vascularity and its life. The diploë evidently wanted only a little assistance outside to recall vitality to the dead, but not irrecoverably dead outer table.

On the Excision of Morbid Growths of the Face.

THE method of removing comparatively small cancerous and other growths from the face by elliptical incisions will long continue in use. But frequently we meet with larger, more or less circular, growths, which cannot be dealt with by so simple a method. An irregular circular mass needs for its removal the excision of a disc, which leaves behind a circular gap. But a circular gap is of all gaps the most difficult to fill. I have met with the difficulty many times, and I find it is most simply (that is with less cutting and carving and subsequent scarring) overcome in the following way. Let the adjacent soft parts be very freely separated from the bone, then some portion of the margin of the wound will be found more movable than others; let this be drawn, tongue-like, towards the centre of the gap, and fixed there with stitches. Opposite this tongue, or at some other point, the sides of the circle can be partially brought together with stitches, so that when the parts are all approximated, the

closed wound will have a tri-radiate or letter Y like appearance. (See Plate V., Figs. 5, 6, 7). On this method large gaps may be made and filled up. The anatomy of the leading divisions of the facial nerve must be remembered as far as is practical, but the preservation of life must be the first object.

It cannot be too frequently stated as a fundamental fact in surgery, that the face may be lifted up from the underlying bones as a living mask, and may, when thus detached, be partially removed and carved, and readjusted, and laid down again, without fear of failing union or failing vitality. I sometimes jocularly say to my class : you may take the face and grind it to powder and mix it with sand, and plaster it on the skull again and it will still live.

The method of excising cancers just described is well illustrated in the following case. An old man had two epithelial cancers, one on the lower lip near the right angle of the mouth, and near it a second inside the right cheek. To remove these freely it was necessary to take away a third of the lower lip, and a circular portion of considerable size from the adjacent cheek. The lower lip was drawn to the right and fastened to the right extremity of the upper lip ; next the circular gap was treated by the method just described, a tongue of cheek was brought forward towards the centre of the gap, and then the parts were so stitched as to leave a Y lying, as it were, on its side. (See plate V., Fig. 5.) Union was quick and complete, and the old man, after a short stay in the hospital, took a long journey home.

There are two circumstances which encourage the surgeon to freely excise cancers of the face. Epithelial cancers of the integuments are mild, and the face is very amenable to manipulation. In an epithelioma of the nose, in an elderly woman, which had been under treatment a long time by the piece-meal-caustic method, and which had all the time been slowly extending, I took prompt, and perhaps rather bold steps. I excised the whole nose, and an adjacent area of face comprising portions of the cheeks, forehead, eyelids, nasal septum, and upper lip. Repair was singularly rapid. The

skin of the face and the mucous membrane of the nose advanced quickly towards each other. The contraction which followed was so great that only a small opening remained where a startling gap had been made. No attempt was made (or seemed possible) to restore the nose. She preferred a small black patch to a false nose. The prejudice against false noses should in my opinion be discouraged; that a well-contrived one is better than any surgically-made nose with its peculiar shape, peculiar colour and halo of scars is an opinion in favour of which much may be said.

Concerning these operations on the face and elsewhere it would be a great boon to the surgeon if some agent could be devised that would make fine lines on the skin, under anæsthesia or before, which would not wash off with blood or sponge, and would cause no irritation. Among other advantages there would be this: a surgeon who could not draw lines with a point of colour would, if conscientious, suspect himself of being unable to draw correct lines with a sharp knife.

On the Entire Removal of One Lip
and the Formation of a Mouth from the Other.

It is only in rare instances, and these mostly in cases of epithelioma, that the entire lip needs to be removed. Frequently a portion, however small, at one end of the lip, if not at both ends, may be safely left. The extensibility of a small portion of lip is very remarkable.

If the angle and the smallest portion of lip can be saved the operation is simple; but occasionally the entire lip, and even a portion of the adjacent cheek, or indeed a portion of the upper or other lip as well may need removal. If a cancer be removed at all it must be freely removed, and it is difficult to conceive any drawback in operating equal to the fatal drawback of a too limited removal.

The restoration of the whole lip by a plastic operation, say such as Mr. Syme devised for the lower lip, although

an advance on previous operations, necessitates extensive incisions and careful dissection, and is followed by more or less conspicuous scars. I have now in several cases restored the whole of the mouth by removing one lip completely, bringing the cheeks together in the middle line and turning the remaining lip round in such a manner as to form a new and efficient opening. The affected lip is removed by a simple but bold V shaped incision, or some modification of it. The adjacent cheeks, or soft parts, are freely separated from the bone, and the cut margins are then brought and kept together. The simple interrupted suture answers every purpose. The silver wire should be very thick so as not to cut so readily, and plenty of tissue should be taken up. In bringing the edges of the wound together the movability, vitality, and uniting power of the soft parts may be counted upon. In speaking of hare-lip I stated a fact which the surgeon may test on himself— that the angles of the mouth may be easily brought together over the closed jaws. It would be quite possible to unite the commissures of the lips, and thereby produce two mouths.

To return to the operation. The mouth thus made from one lip is at first small and circular, but it quickly acquires a more shapely form. In nearly all cases it will be desirable, and in some really needful to increase the size of the aperture, as well as to secure a more natural appearance, by making an incision at each side (see Plate VI., Fig. 1 and 2.) where the angles would naturally be situated. These lateral extensions of the mouth may be made at the time, or after the first operation has been followed by firm union. Ten or fourteen days even may be attended by such change in the shape of the mouth as to suggest a natural site for the incisions. If there be any doubt about the propriety of anæsthesia all the steps of the operation should be taken at one time. When the lateral incisions are made, the skin and mucous membrane should be approximated by silver stitches (not thick) carried across the margin of the new lip near the new angle. I can say very positively there need be no

difficulty in getting and keeping a sufficiently big and fairly symmetrical mouth.

In one case I removed the whole of the upper lip for epithelial cancer in an elderly man, and formed a mouth from the lower lip. In this case the lips were very long, and thin, and the mouth, formed altogether of the lower lip, was quite big enough without the lateral cuts.

A Method of Operating for Hare-lip.

The methods of treating hare-lip resolve themselves into two classes : the carving and saving method and free removal. The carving methods are necessarily complicated in description and usually complicated in practice. In my experience and observation, success is best secured by a simple method boldly carried out. The steps that require to be bold are two : free separation of the affected parts from the bone, and free paring of the margins of the cleft. Before operating there is difficulty in bringing the margins together, and it is naturally feared that if some of the margins were cut away the difficulty would be increased. If, however, the cleft and adjacent portions of lips, cheek, and nostril, are freely lifted from the bone, the margins of the cleft can be easily brought together, however much tissue may be cut away. In some cases the wing of the nose and the cheek near it should be separated from the bone, in order that the top stitch may draw the flattened nostril towards the middle line. The mobility (or movability) of detached parts of the face may be proved by a single and bloodless experiment. A surgeon, before a mirror, can make the angles of his mouth meet over his closed jaws ; there would be no difficulty in paring them and stitching them together in such a position. In speaking of another operation, the removal of cancer, I am in the habit of saying that the face may be lifted up from the underlying bones as a living mask, cut to new shapes, put into new positions, and laid down again, without fear of failing union or failing vitality.

The steps of the operation which I prefer are these : with a long narrow knife (a rather long tenotome say) separate

the soft parts to the extent already spoken of; then pare each side of the cleft so that a curved notch is left at, or below, or near the centre of each margin. Next each notch is incised outwards, nothing being cut away at this step, in a manner and to an extent suggested by the short dotted lines in the diagram. (See Plate VI., Figs. 3 and 4). The bit cut away should reach well into the nostril above, and well into the thick of the lip downwards. It is convenient to use a kind of ring forceps—the ring having a point which can be so fixed as to be a guide in making the notch. I use German silver forceps somewhat of a sugar-tongs pattern. Any size or shape can be quickly obtained. The forceps should be adjusted on the margin of the cleft *before* any traction is made, or the cut-off paring will not be of the intended shape. A narrow knife, transfixing the lip, is carried with a fine sawing movement along the margin of the forceps. Free removal is the great secret of success. The notches should be made opposite to each other. An assistant must draw down with toothed forceps each corner of the cleft, and so stretch the margins that the notch is unfolded while the stitches are put in. The first stitch is the most important, and must bring the apices of the notches together and bear the chief strain. The stitch must be single, made with thick silver wire, and plenty of tissue must be taken up. Those who prefer it may put a button at each end of the central stitch. A stitch near the nostril and another near the margin of the lip, so arranged as to leave the greatest possible symmetry of lip and nostril, complete the operation. The single interrupted stitch of thick silver wire is much better than the twisted suture. In this, as in other operations, I have the silver wire soldered to the needle, so that there is no tug in drawing the wire through. A single tie of wire suffices, the cut ends being curled up with forceps. If tension be at all marked, the soft parts must be more freely separated from the bone.

The labial artery should be torsioned or tied with fine gut; no oozing should interfere with delicate adjustment.

Pressure with bits of fine Turkey sponge best checks whatever bleeding there may be between the soft parts and the bone.

The stitches may be left in six or eight days. There is no advantage in taking them out early. The transverse linear cut which any stitch makes ceases early at a certain point; the resulting linear cicatrix is soon lost and it would not be lessened by early removal.

On a Method of obtaining Symmetry after Operations for Hare-lip.

It is a melancholy, but in a great number of cases an unavoidable fact, that some unsightliness remains after operations for hare-lip. The want of symmetry is occasionally very conspicuous, especially if it occurs in an otherwise comely girl or woman. That this deformity should be tolerated for a life-time, with no attempts at improvement, and no enquiry into its possibility, is a curious result of custom and timidity both of the public and of surgeons.

In no department of the surgery of policy, as distinguished from the surgery of necessity, can greater benefit be predicted than in the interference with old and unsatisfactory cicatrices in hare-lip.

It would be erroneous and unjust to infer that in these cases the operation has been improperly performed. An early operation is essential to give shapeliness to the alveolar cleft, as well as for the sake of appearance and efficient feeding; but in certain cases the circumstances are such, that no possible operation at an early period can be satisfactory for a life time. The perfection of to-day is a defect to-morrow. An old and defective cicatrix may be due to various causes: the bony irregularity may have been extreme; the operation may have been too early or too late; or (as it must be admitted too frequently happens) the operative proceedings have been too timidly carried out; or a number of hindering causes may have been combined.

In such cases as these, much improvement may be

gained by a second operation, which shall remove the old scar, and bring bulky portions of lip together. It is not necessary to dwell on the steps of the operation, but free separation from bone, and free removal of defective parts are the fundamental steps. As there is no tension whatever on the margins of the wound, they may be brought together by simple interrupted stitches of thickish silver wire. When adolescence is reached, the lip tissues are often singularly abundant. I have seen in cases where no operation has been performed, the thick margins of the cleft not merely in contact, but actually overlapping each other. Personal experience justifies me in saying that an excellent full lip with certain union and early disappearance of the traces of an operation may be counted upon.

A second operation is especially desirable where the old cicatrix is markedly imperfect in its whole extent, or at the nostril, or at the margin of the lip.

But there is another class of cases, the most numerous of all, and to speak of these is my express object at present, where the scar is good and the lip fairly full, but where there is, nevertheless, a decided notch in the lip at the lower end of the cicatrix. This notch is most noticeable at the junction of the mucous membrane and the skin. It is the upward encroachment of the *red* lip which strikes the eye. A notch simply at the free margin of the lip would scarcely be observed, and not at all when the mouth was shut.

In these cases, and in cases where the severer (but very safe) step of a second operation is objected to, or where improvement is sought after a few years, but before adolescence (a second complete operation should not be done before growth has ceased) I have devised and performed an operation which I believe to be of great use, and which I now submit to the judgment of others. Its leading principle is this : make another notch on the *other* side of the middle line, make it as far from the middle line on the opposite side as the first notch, and make it as like the first notch as possible. It must be a fundamental rule that the new notch shall invade the true skin, so as to permit the red mucous membrane to run upwards

in the same pointed manner as in the old notch. (See Plate VI., Fig. 5).

The operation is no doubt one of delicacy, but of less anxious delicacy than is needful in operations on the eye. The marginal strip of lip should be carefully mapped out and a few marks made with the assistance of anæsthesia, if the child or young person be restless. The mapped out piece will begin at the skin in front, cross the lip and take in little of the posterior aspect; this should deeply be outlined with a small sharp knife and then cut out; with it may be cut a varying amount of subcutaneous and submucous tissue. The size of the strip of skin and mucous membrane, and the amount of underlying tissue, which it is desirable to remove, must be determined by the size of the notch which is the intention of the operator to imitate. The mere removal of a strip of mucous membrane and a point of skin, would produce great improvement. Cold and pressure should be kept up until the bleeding stops. Neither stitches nor dressing are needful, but it is very possible that surgeons who adopt the principle of the operation—the making a second notch—will use their own judgment in detail, and probably suggest improvements on the method I have used and now describe.

When should the operation be performed? Not too early. Not immediately after the first operation. When the child is a few years old, or any time later, the bony framework will have settled into place, and the notch will have acquired its permanent character. I have performed the operation in three cases, and with unmistakeable improvement.

THE NATURE AND TREATMENT OF OZÆNA.

In the following remarks I speak of ozæna solely from personal experience. I purpose refraining from controversy and from a discussion of the various definitions which have been given of it. Ozæna, as I understand it, is an ailment of the nose in which there is an increased secretion of mucus, with frequent retention of it so that it dries in

PLATE VI.

Figs. 1 and 2 show the formation of a mouth from one lip.

Figs. 3 and 4 show a method of operation for hare-lip to avoid a notch.

Fig. 5 shows a method of restoring symmetry after old and unsatisfactory operation.

Fig. 6 shows a method of removing the tongue.

PLATE VI.

Fig. 1.
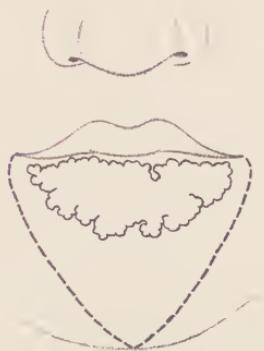
Fig. 2.
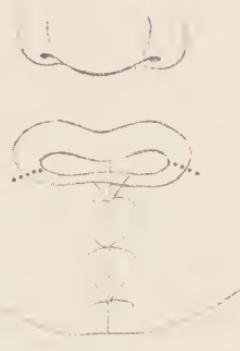
Fig. 3.
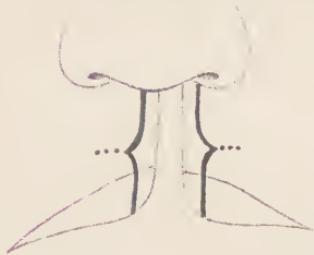
Fig. 4.
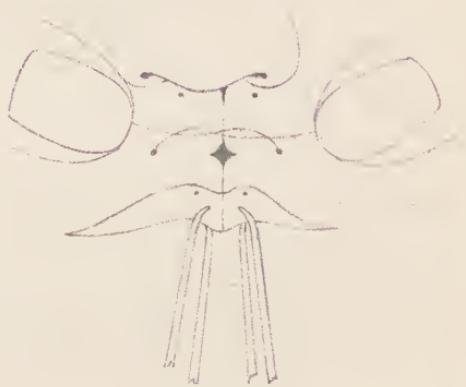
Fig. 5.
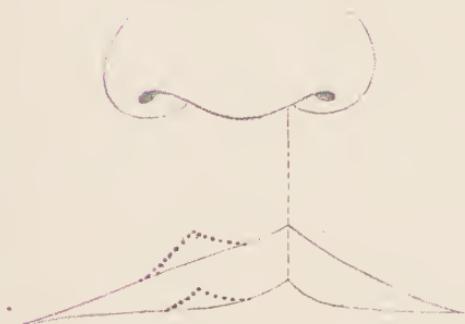
Fig. 6.
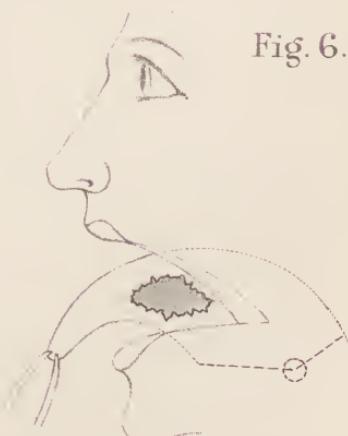
greenish, or greenish yellow masses; there may possibly be limited and slow caries, when some pus or blood will be mixed with the mucus; and usually, there is a peculiarly unpleasant characteristic odour given out from the nares.

Ozæna may be an exceedingly slight or it may be a severe disease. In the slightest forms there is simply an occasional sense of obstruction, followed by the expulsion of masses of green mucus. In this degree it frequently, no doubt, escapes notice. In other cases the sense of obstruction may be greater, and the expulsive efforts in blowing the nose need to be more vigorous and more frequent; even in these the peculiar odour may be absent. In others again, and in most of those which come under treatment, the odour is the symptom most complained of. In a small proportion of such cases, the severer ones, there is some purulent discharge, and occasionally a few drops of blood, and possibly even minute fragments of bone.

Observation has obliged me to look upon syphilis, acquired or hereditary, as the root of the mischief. Not only does historical enquiry lead me to the conclusion, but also the entire similarity of the symptoms in adults with confessed syphilis, to the symptoms in very young adults with supposed struma.

In regard to the pathology of ozæna, we must remember that not only is the mucous membrane close to the bone, but that the submucous tissue is also the periosteum. In the slighter and vast majority of cases there is not actual destruction, or caries of bone, though, probably, the inflammatory action implicates it. (See note on " Continuity " in pathology.) The mucous and submucous tissues are chronically inflamed and swelled. The inflammation leading to the increased secretion of mucus, and the swelling causing its retention in spaces left between the septum and the outer nasal walls. The odour is justly attributed to the decomposition of the temporarily blocked-up masses. In a few cases the inflammation passes on to lesion of the surface—abrasion, and in some cases ulceration. In a still smaller number of cases the inflammation not only involves the bone, but leads to slow

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and usually limited caries. Even where caries sets in the disease is mild, and for the most part limited in extent. The discharge may contain some pus, or a few drops of blood now and then. Where slow molecular loss of bone goes on, some authorities appear to consider that lupus is present. In the cases which I have seen and known to have been regarded as lupus by eminent surgeons, I have failed to find grounds for putting them into a separate class.

Returning to ozæna it is a singular circumstance, unless my experience has been a series of curious coincidences, that in the variety which is due to hereditary syphilis, and which rarely proceeds to caries, the subjects are usually girls about the period of puberty. Such girls are frequently red-cheeked, and otherwise seemingly robust; sometimes they show signs of so-called struma in the glands or in the bones. The smell is the chief complaint, as it occasionally not only keeps them from society but even more or less from the domestic circle. In such cases the external parts of the nose and the bridge are in little or no danger.

In the treatment I wish to lay special stress on the great benefit of a seton (of few threads) on the back of the neck. If this be strongly objected to, a patch of iodine irritation may be maintained with good, but less good, results. The thread, or threads, are persistent in operation, not liable to be overlooked, and give little trouble. The fœtor and discharge are best treated by Thudichum's nasal douche with tepid water containing Condy's fluid. Once a day will mostly suffice to keep away all fœtor. Internally, in cases of acquired syphilis, the iodide of potassium made alkaline and well diluted, should be given. In the ozæna of hereditary syphilis, the syrup of the iodide of iron with or without a little cod-liver oil, must be given for a long period. In more than usually refractory cases I believe a single minute dose of mercury, daily, to be decidely beneficial.

It is well to bear in mind that this ozæna and caries are quite distinct from the severe (and also syphilitic) disease, *spreading periostitis* of the upper maxillary and nasal bones. In some cases, especially in cachectic middle aged persons

with long sleeping tertiary syphilis this periostitis is very formidable. I believe there is a growing tendency to be very patient in its treatment. Time, the iodides, and cleanliness (I should put a thread or two under the skin at the back of the neck) are preferable to active operative interference. The separation of a necrosed fragment is extremely slow and tedious, but there are two powerful reasons against any attempt at removal. It is frequently difficult or impossible to know how much to remove, and secondly, the operation sets up further and more active disease. Of course loose fragments should always be removed.

The Treatment of Nasal Polypi by the Tissue Injection of Iodine.

The treatment described here is the injection of iodine tincture into the substance of the simple gelatinous polypi. I have not used it in other varieties. Whether it would prove of service in the fibrous or naso-pharyngeal polypus, experience only can prove; whether we should even try to get the experience is a matter for grave reflection. In the fibrous growth the vascularity is great, and the gentlest manipulation is occasionally followed by alarming hæmorrhage. Yet the recognised methods of treatment are so formidable, some of them involving extensive facial scars at the threshold of life, that to me such efforts would be quite justifiable, the more so that a few cases have been recorded of their spontaneous diminution and even of alleged disappearance.

The structure of the simple gelatinous polypi is singularly well adapted for parenchymatous injection; it is easily permeated by fluids and is not very vascular. When ten or twenty drops of iodine are injected into a greenish or yellowish, or pinkish polypoid body, it instantly assumes the appearance of a ripe purple plum.

It is not proposed to inject iodine into every even simple polypus. Where there is one accessible polypus, well pedunculated and seated in a large nostril, the forceps or snare effects a quick and not very painful removal.

These single, accessible, and easily removed polypi are unfortunately in a minority.

I have found the parenchymatous method serviceable under the following circumstances : where the nares are narrow or so constructed that the use of instruments is difficult; where the position of the polypi causes operative difficulty; where the polypi are multiple especially if the nares are also narrow and perhaps *both* crowded; where there are relapses, whether from unavoidably imperfect operations, or from a local tendency to reproduction; where the patient shows marked timidity.

No polyus should be subjected to treatment which is not fairly seen and reached with ordinary appliances, but it can be treated at an earlier period with a hollow needle and a few drops of iodine tincture, than by the forceps or snare.

The apparatus needed is very simple—the hypodermic syringe, with its longer needle, and a little tincture of iodine. A director, a probe, or more complicated mechanism if the surgeon prefers it, serve to keep the nostril open. It is useful to be able to attach the number one aspirator needle to the subcutaneous syringe. A small German silver connecting link (Mr. Salt made one for me at a trifling cost), kept in the hypodermic case, will be found very convenient for this and other purposes—as for deep diagnosis or deep parenchymatous treatment. When the polypi are numerous and lie towards the posterior nares, this longer needle, which commands the whole nostril is highly serviceable. The needle should be carefully passed right into the substance of the polypus, and five, eight, or ten drops, injected according to the size of the growth, and its capacity for holding fluid. The needle may be passed on and a few drops inserted at a greater distance, or it may be passed through one into another, stopping on its journey occasionally to leave a few drops of iodine. As a rule it will probably be more convenient and efficient to take out the needle and reintroduce it, carrying it at a lower level for the deeper polypi.

The injection should be repeated at intervals of two or three weeks; perhaps the best rule of guidance in this matter is to repeat the injection when the shrinking process set up by the previous injection has ceased. The polypus becomes firmer and of a deeper colour, at the same time it becomes smaller and eventually disappears.

My late house surgeon, Mr. Cordley Bradford, treated at my request three cases successively by the method now described, and with complete success. I have had sufficient experience to convince me that the method is so successful in results and easy in manipulation, that it is worth remembering in reviewing the several methods of dealing with nasal polypi.

My final remark is to suggest a long interval, a few weeks at least, between each injection. A man came to me three times at intervals of a fortnight—each time much improved. He told me the third time that circumstances would prevent his seeing me again for a considerable time. Three months later not a trace of polypus was to be found.

Since the above was in the printers' hands, Mr. Reginald Harrison has advocated the use of multiple punctures with a surgical needle. The method is simple and may well be used before other methods are adopted.

The Treatment of Naso-Pharyngeal Polypus.

There is a general tendency in surgical opinion in favour of free exposure of the formidable growth—naso-pharyngeal polypus. Nelaton's method of reaching it by division of the palate is no longer approved. Of the various methods of turning down the nose, or of partially resecting and temporarily lifting up the upper maxilla, I will not speak. I desire now to suggest simple measures prior to any step which in a disease of early adult age, necessarily and extensively scars the face.

A few years ago a very formidable case came under my care. A young gentleman, about eighteen (who had the advantage of being seen by several eminent surgeons), found that breathing through the nostrils was getting more and

more impeded. Then the bones of the face were made more prominent, giving the nose a flattened appearance, at the same time the palate was being thrust down towards the mouth and larynx. A growth of firm character, and dark red colour was visible at the right nostril, while the septum was pushed to the left in such a manner that the new growth tended to occupy a central position. It was also readily felt in the pharynx as a large mass interfering both with breathing and swallowing. When the growth was touched, as in examination, very free hæmorrhage followed. The symptoms increased in severity and at length became so distressing and the breathing so retarded, that it was clear that there were not many days of life left unless something was immediately done. Sleep was only possible in fits and snatches with the head stooping forwards.

I laid before the lad's father (a physician and scholar of high repute) the various operative methods at our disposal. He so strongly objected to any interference with the face, and especially the bones of the face, that I did not continue to urge it—the more so because one high authority, the late Mr. Syme, had preferred and carefully described the method of avulsion. I was fully alive to the dangers of the method; the risk of extreme hæmorrhage, and even the possibility of fracture of the base of the skull, as in Mr. Cooper-Forster's well-known case. But, while holding the avulsive method in reserve, I resolved to try other less forcible methods first. I purposed putting a wire écraseur around the growth as high as its attachments would permit, working the écraseur through the nostril (enlarging this for the purpose), and bringing the tumour when separated through the mouth. I found little difficulty in passing a stout cord by means of an elastic catheter along one side of the tumour into the mouth, and leaving it there I passed the catheter, armed with another cord, along the other side of the mass, the two cords were withdrawn in the mouth, firmly tied, and the resulting loop carried by means of the fingers (with some traction on the cords in the nostril) behind the growth. The cord was then made to draw a wire cord around the growth—the loop

seeming to be high up, and the écraseur put in action. To my extreme disappointment the wire loop quickly came through leaving the great bulk of the attachment evidently undivided. I believed at the moment that I had to do with a multiple pedicle, and that I had only divided one and a small attachment. I found afterwards that in reality the wire cord had broken, but in so disguised a manner that the break was not seen by or made known to me. The hæmorrhage was now very abundant, and the lad who was marvellously courageous, and had begged to have no anæsthetic, was now in distress and danger. Immediately resolving to adopt Syme's method with all its risks, I took a pair of large strong curved sequestrum forceps, and carrying the blades through the mouth, well up into the pharynx, behind the posterior nares, I got an extensive and firm grip—a grip fortunately well up to the roots of the mass—and resolutely turning the mass round and round again several times with both hands, the whole mass as big as a closed fist came through the mouth. The bleeding practically ceased at once. The finger showed not only that the whole growth was removed, but also that the attachments had been most extensive, for the bony surface was denuded at the roof of the pharynx, the adjacent margins of the posterior nares, and what seemed the under surface of the right orbital floor, but which was probably the inner wall of the antrum which had been pushed upwards and outwards by the growth of the firm tumour. The periosteum removed with the tumour was so thickened and incorporated with it that it could not be distinguished as a separate structure. The recovery was complete—every portion of bone retaining its place and vitality. Although this case ended so satisfactorily I very much regret that the écraseur could not be used. In the case of a very large mass filling the nose and pharynx, and practically the mouth (the palate intervening), the reserve measure of a big forceps, and twisting with both hands, is a formidable one—too formidable to propose as a general rule.

I venture to append the following suggestions respecting removal of naso-pharyngeal growths. An English elastic

catheter, strengthened if needful, with a fine wire stilet, carried first on one side and then on the other may be made, with patience and care, to carry a cord behind and around the tumour. The cord may be followed by the ordinary chain (perhaps better than wire) of an écraseur, and the chain with finger and forceps may be, and ought to be, resolutely carried well up to the pedicle. (See Plate VII., Fig. 1). The nostril may be freely incised (if the écraseur does not easily pass through it) downwards to the bony palate or even in some other direction also. The bleeding is the most important question. Before the operation a long strong cord should be carried along the floor of the nose and brought out of the mouth; to the part hanging out of the mouth a very small round Turkish sponge, squeezed out of an antiseptic fluid and large enough to well fill the upper part of the pharynx, should be attached. If, during the use of the écraseur hæmorrhage should become really serious, let the chain be *rapidly* worked through, the already seized tumour brought through the mouth, and the sponge quickly and firmly drawn up to the upper pharynx. When the pedicle is quite divided, the bleeding becomes very manageable. A good light is indispensable. The utility of letting the head hang over the table should be remembered. Every preparation, in this as in other operations · for naso-pharyngeal polypus, should be made for opening the windpipe, but it need not precede the steps now described and in all probability will not be needed.

Should the growth reappear the facial operations might be discussed. It seems that the naso-pharyngeal growth is peculiar to early life, and this period passed over recurrence need not be feared. It is even said that spontaneous disappearance has been known. It would be unwise to wait for it. Elsewhere the injection into the substance of the ordinary soft nasal polypi is described—whether such a method of treatment with a long needle would be successful in the fibrous polypus only trial can show. Would it not be worth trying while the growth is not yet very large or very vascular?

A Method of Removing the Tongue.

I do not propose to discuss here the general question of the propriety of removing the tongue. I confine myself to one or two remarks. I believe life to be prolonged by early and efficient removal. There are, in my experience, few cases in which partial removal of the tongue is preferable to entire removal; and surely if an error of judgment is possible, it is better to err on the side of too free, rather than on the side of too limited an operation. An operating surgeon rarely regrets the complete step; I am confident that he frequently regrets the less complete proceeding. There are one or two ways in which an operation lengthens life,—by the prevention of hæmorrhage, by the removal of pain, and by the absence of difficulty in taking food. But the prolongation of life is not the only consideration. Cancer of the tongue is perhaps the most painful malady which human beings suffer from. The pain, the hæmorrhage, the fœtid fluids, always in the mouth, the dribbling of saliva, the difficulty of speech and mastication, the fixity of the tongue, combine to keep up an ever present sense of discomfort and depression. Few would hesitate to put in the place of these extreme evils the swelling of sub-maxillary and cervical glands, and a gradually fatal exhaustion. By the method of operating I am about to describe, as also by some other methods, a singular degree of intelligible speech is preserved.

To secure the benefits of an operation it must be early, the disease must be circumscribed, and the glands not at any rate conspicuously large. Too anxious a scrutiny cannot be given to an ulcer on the tongue of a middle-aged person. The policy of "waiting" and "watching" in the early stages of cancer is terribly destructive to life and comfort.

I have removed the tongue, now many times, by a combination of steps which are simple yet effective, and which, in my opinion, better secure advantages and better avoid disadvantages than any other operation which is known to me. I desire to get free access to the root of the

tongue, or the part operated upon, not only in order that the division of the structures may be more carefully designed and accomplished, but also in order that hæmorrhage, if there be any, may be under more direct control. I desire also to remove the cancer (the accessible tongue in short) freely, but not to remove the extrinsic muscles which form the floor of the mouth in order that repair may be more rapid, and that speech, and chewing, and swallowing, may be preserved as far as is possible. I desire especially to attain the needful objects with the least severe operative steps.

Touching the details : First the cheek is divided backwards from the corner of the lip to the vertical ramus of the jaw—a step which has been taken by others also. It gives sufficiently fair access to the back of the mouth, and yet leaves a wound that heals by the first intention, and leaves little scar—a trifling matter in a person past middle age. This method is unmistakeably less severe than that of dividing and separating the two halves of the lower jaw. Then the root of the tongue is seized well down and far back, between the finger and thumb of one hand, while the other hand passes a needle (curved, with handle) through the structures from the end of the thumb on one side, to the end of the finger on the other. The needle carries two strong cords, which are left in the channel made by the needle which is now withdrawn. Next the chains of two écraseurs are drawn, one after the other, through the channel by means of the cord. The front cord should be drawn first and care taken that it does *not interlock* with the other cord before the chain is drawn through. The first chain being held forwards, the second is drawn through. The two chains are then fixed and tightened in this wise : the front chain is pressed well to the floor of the mouth in front of the tongue, and the backward chain is pressed well down behind, in close contact with the anterior pillars of the fauces (see Plate VI., Fig. 6). The two écraseurs are then worked slowly, and simultaneously by two persons. With the cheek well divided, and the écraseurs slowly worked,

there is no trouble with hæmorrhage, although it may be well to have ice and the perchloride of iron, and the black cautery at hand. Finally, adjust the cheek wound with a few silver sutures. Recovery is singularly rapid and, when complete, the mucous membrane covers the muscles at the floor of the mouth. The muscular floor often becomes convex, and greatly assists chewing and speech.

To summarise then: Divide the cheek freely. Transfix the tongue well downwards and backwards at its root, and pass two écraseur chains through the line of transfixion; work the two chains simultaneously, one below the tongue in front, and the other close to the pillars of the fauces behind; stitch up the cheek.

I have also removed half the tongue by means of two écraseurs. One chain is made to work transversely in front of the pillars of the fauces, the other works in the long axis of the tongue; the tip of the tongue being well notched with scissors to receive the chain. This operation is more difficult, but if appropriate steel pins are made to transfix the tongue until the front écraseur is in a good groove the object in view may be certainly obtained. If a few long ungainly teeth interfere with the free use of the fingers in the preliminary steps they should be removed.

In a few hours cold milk is easily taken by the mouth, and on the second day simple words are frequently spoken. In some timid temperaments support by the rectum may be carried on for a few days. The mouth should be frequently rinsed with Condy's fluid and water.

A Case of Probable Herpetic Eruption of the Œsophagus, Simulating Organic Œsophageal Stricture.

The following case seems to be one of interest and instruction. I had never heard, or seen, or read of any similar case. I give its essential features here.

I was asked by his family adviser to see a well-to-do retired publican, for what appeared to be stricture of the œsophagus, attended by urgent symptoms. He was a little

past middle life, tending to stoutness, bald and grey, of clear pink skin, no corneal arcus. The skin was thin, dry, and on the hands of a slightly scaly character. He had been formerly a somewhat free liver, but there was no history of syphilis, and he usually had fair health. While in his customary health and making no complaint appertaining to strength, flesh, appetite, or sleep, he complained of some difficulty in swallowing, and in the course of two days this difficulty became very marked and distressing. In this state I saw him. He was quite unable to swallow solids. The attempt to swallow fluids was extremely painful, and accompanied by much spasm of the neck and face. Sometimes a little passed on to the stomach, but frequently the whole of the fluid was returned. There was a most copious secretion of mucus of a frothy character, which was almost continually regurgitated, but most freely so when efforts were made to swallow. It appeared to be unmixed with blood or pus, but mixed with portions of masticated food. His able and attentive medical attendant could discover no intra-thoracic lesion, no aneurism or thoracic cancer. There had been no history of ulceration. Corrosive fluids had not been drunk. All the parts accessible to the eye and the finger were healthy. We, I think naturally, took a serious view of the case and communicated it to the friends. We saw him again, together, on the following day when he complained very much of pain in the mouth on taking anything into it. He said he had as much distress in putting liquids into the mouth as he had difficulty and distress in swallowing. In fact, when he took anything the face was quite contorted, and there was some writhing of the body. A careful examination of the mouth now showed a couple of patches of eruption on the naturally rather pale soft palate, one on each side of the middle line. Each patch seemed a cluster of vesicles which were flat, and had the appearance of having recently burst. There was not a red base common to all the cluster of vesicles, for the pale palate was visible in pale lines among them. The œsophageal symptoms continued unabated.

I did not see him again, but I was informed that two days after my second visit the symptoms rather suddenly disappeared, and that he quickly seemed in his usual health, swallowing both solids and liquids with complete ease. Two or three weeks afterwards he lost his life from an unfortunate mistake. He swallowed at bed time what he believed to be a night-draught, but which was really an eye-lotion containing atropine. No post-mortem was made. His medical adviser believed, and still believes most confidently, that there was at no time any suicidal tendency.

The first remark on the above case which offers itself is the rather sudden subsidence of symptoms of extreme mechanical difficulty in swallowing, and the next is the probability that a condition of the palate, which when fluids were brought into contact with it gave rise to facial contortion, was similar to the temporary condition of the œsophagus, the latter of which by inducing spasm prevented the passage of everything except fluids, and those with difficulty, and sometimes not at all. This is of course only inferential, a positive opinion was not justified, because in organic changes of mucous tubes it is not at all infrequent to find eruptions near these surfaces. A man with stricture of the urethra is more than other men prone to eczema of the prepuce or penis. Vesicles, pustules, pimples, appear about the anus in inflammation or cancerous disease of the rectum. When, therefore, we saw on our second consultation, a slight eruption on the palate, we did not at the time suspect that a similar condition might exist in the œsophagus. This was an after thought which I suggest for what it is worth, and as I have said from inference and analogy.

It is always easy to be wise after the event, but to-morrow a surgeon might be called to see an adult past middle age, where, with an eruption on the mouth, there might possibly and probably be an epithelial cancer at the junction of the pharynx and the œsophagus. There might possibly be a ring of eczema or herpes of the mucous membrane.

Altogether I think this case teaches a lesson worth

knowing : if there be no intra-thoracic pressure, aneurism, or cancer ; if no history of syphilis or contact of caustic fluids, or no history or sign of other ulceration or cicatrisation ; if there be no evidence of hysteria, supposing the patient to be a woman or even a man, we may, in cases of very sudden accession of symptoms, bear in mind the alternative which the above case suggests.

CELLULITIS OF THE NECK.

I SAW, in consultation with his medical advisers, Mr. C., a very stout man of middle age. His appearance suggested free eating and drinking, but he would not admit this. He was a man of great mental activity, and added the labours of a voluntary Sunday preacher to the duties of a responsible vocation during the week. His illness began a few days before I saw him with the symptoms of a cold and some swelling of the neck. He rapidly grew worse and when I saw him the swelling of the neck was extreme, especially in front, the chin being scarcely more prominent than the swelling which extended from the chin to the sternum. The superjacent skin was of a pale earthy tint and smooth, but not glossy, and certainly not red. The hardness was uniform with some pitting on firm and prolonged pressure. The nervous prostration—a combination of debility, dejection, and indifference—was extreme. The temperature was high and the pulse rapid. There was an incessant expectoration of finely bubbled frothy mucus, but no cough or dyspnœa were noticed or complained of. I made several incisions, and advised a continuance of the poultices with the utmost possible attention to nutrition in diet. He sank in a few days from exhaustion and without difficulty of breathing. From beginning to end there was no sign of softening, or suppuration, or sloughing.

A few years ago, I saw with his family attendant, an inn-keeper, who resided in a healthy locality in the neighbourhood of Cannock Chase. He was a very stout red faced man, of intemperate habits. After a prolonged exposure to severe weather he had what seemed a bilious attack with cold and

sore throat. In a few days he was better; he got up and attended an inquest but was shortly after seized with rigors, severe pain in the neck, and a remarkable loss of use of the left arm. In a day or two later, great and rapidly formed swelling appeared in the neck, especially at the front and left side. In a few hours after the formation of the swelling he began to expectorate large quantities of bronchial mucus, but without marked cough or dyspnœa. The general debility and nervous depression were strikingly seen. In a few days he died with pain in the head, delirum, and intense prostration. The swelling remained to the last pale and hard, with no sign of redness or fluctuation on death of skin or cellular tissue. No *post-mortem* was made.

During one of my visits to the Queen's hospital a boy of fifteen years was brought into the hospital in a state of marked debility and distress. He stood with difficulty and his face showed extreme anxiety and depression. His breathing was frequent and audible. Around the front half of his neck and entirely covering it was a circumscribed collar-like swelling of the colour of his skin generally, which was of a slightly earthy tint, and the swelling was uniformily hard. His temperature was high and his pulse rapid. He was immediately put under an anæsthetic to a degree which enabled us to incise the skin over the trachea without complaint. I then carried the incision carefully down to the trachea. All the parts were matted together in a greyish yellow brawny mass. On reaching the trachea a little very dark and very fœtid pus appeared in the wound, and appeared to come upwards from the lower part of the neck. The pus visibly and audibly bubbled as though the point of the knife had entered (it certainly had not) the trachea and air was coming through the fluid; perfect rest, warmth, fresh air, and nutrition, were sedulously attended to. The next day he was strikingly better, and the improvement continued for two or three days, when the febrile symptoms returned. The temperature rose to 104; the prostration rapidly increased, and in forty-eight hours after the relapse he died.

The *post-mortem* revealed a singular intra-thoracic condition.

There were signs of cellular inflammation over the whole front of the neck. At the front of the neck, and descending around the trachea into the anterior and posterior mediastina, there was a thick stratum of varying depth of wholly dead, black, fœtid, connective tissue. In the vicinity of the trachea this was moistened by a small quantity of diffused black fœtid pus. There was nowhere an abscess. The striking circumstance of the case was this : a stratum of unquestionable dead, black, stinking, cellular tissue, extended along the pericardium and the pleura, a considerable distance. The heart was enveloped in a pericardium, the upper half of which was dead as regarded its sub-serous tissue. In the same way the upper half of each lung was surrounded by a parietal pleura the sub-serous tissue of which was entirely gangrenous. The layer of gangrenous cellular tissue under the serous membranes varied in thickness from a quarter to half an inch or even more. In the mediastina, and around the trachea, it was still more abundant and surrounded the structures lying in those spaces. There was some but not abundant serous fluid in the pericardial and pleural cavities. The serous surfaces of black and deep purple colour had not lost their polish. The bronchial mucous membrane was in some degree congested, but not excessively so. The other organs were healthy. (See Plate VIII., Fig. 3.)

I have seen other cases, less severe, where cellulitis has existed in the form of a large patch on the back or side of the neck, and when the constitutional symptoms were slight. A woman married, aged forty-seven, came to the hospital with a large hard, white, and somewhat tender and painful swelling at the left side of the neck. It stretched from the lobe of the ear to the posterior middle line, and extended upwards in the scalp towards the occiput, and downwards to within two inches of the clavicle. It had been coming on three weeks, and there were no active constitutional symptoms. Unfortunately I have no note of her habits. A broad horseshoe of skin, below and on each side, was painted frequently with iodine liniment. In a fortnight the swelling subsided.

I saw, with his family adviser, a gentleman at Aston

of middle age, who had formerly lived much in India, and had a markedly sallow complexion. There was a firm, hard, white swelling on the left side of the neck and coming near the middle line in front. There was an incessant and abundant spitting of frothy bronchial mucus. The temperature was 102, and accompanied by great nervous depression and muscular debility. A broad horseshoe of energetic iodine counter-irritation was the chief treatment, next to support. Contrary to my expectation he made a favourable recovery, the swelling subsiding, I was informed, without redness, suppuration, or sloughing.

These cases of cellulitis of the neck suggest several items of interest. They occur as a rule in men at middle age; in men who combine much eating and drinking with much mental and bodily activity, and who are also especially subject to exposure to cold.

All the acute and fatal cases I have seen have been in males, but I do not say the cases have been numerous enough to justify a sweeping conclusion. It is probable that sex *per se* has little to do with the matter, but rather a combination of circumstances which is found mainly in men. It is in men we find a union of much eating, much drinking, great mental activity (perhaps worry also), much travelling, and probably long journeys in all weathers.

It is not proposed to speak here of the pathology of cellulitis, other than to point out that it has distinctive clinical characters as distinguished from erysipelas or diffused abscess. In acute cases at the front of the neck sloughing of the cellular tissue would seem to be rare; the acute cases die before actual death of tissue occurs, and chronic cases recover without sloughing. The case of the boy, however, should teach us that gangrene of the deepest cellular tissue may be present with no external characters to betray it. The fatal cases being in private practice, and also at a distance, were unfortunately not examined after death.

A peculiar feature of the seat of the origin of cellulitis is its occasional, if not invariable, depth. In one case which I saw, an early symptom, before obvious swelling of

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the neck, was paralysis of an upper limb, evidently from deep pressure on the brachial plexus. In a rectal case, paralysis of one limb resulted from pressure on the sacral plexus.

In describing the causes of the rough pathology, I have indirectly given some of the clinical symptoms of cellulitis of the neck. Noticing then the size, the habits, the activity, and the liability to exposure of the victims of the disease we are enquiring into, we pass on to observe that, locally, there is a thick, large, hard, pale collar-like swelling gradually subsiding at the sides and back of the neck. The general condition is one of extreme nervous prostration and fever; the temperature, two or three days before death, reaching 103. The secretion and expectoration of bronchial mucus is remarkable. There is, it may be, gangrene outside the pleura, but there is not the ordinary pleurisy of physicians; there is gangrene, it may be, around the bronchial tubes, but there is not the ordinary bronchitis of physicians. Relapses are prone to occur, and, which gives much gravity to the relapses, each relapse involves an extension of the disease. The new area of extending cellulitis may be on the surface, but it may also be deep, uncontrolable, and quickly fatal. It is probable that the fatal cases are due rather to a relapse and extension, than either to progress of the original disease, or intensification of shock. In my experience death is due more to exhaustion than to impeded respiration.

The two extremities of the digestive tubes seem to be favourite localities of cellulitis. I have not met with cellulitis in any part of the body so severe, so uniform in its causes, and characters, and mortality, as in the neck and around the rectum. I do not say that the cellulitis of the two localities are exactly or greatly similar, nevertheless, they have much in common as will be seen in the enquiry into cellulitis around the rectum in another page. The sex, the age, the drinking and eating, the dimensions of the patients, the ceaseless active energy, the exposure to cold, the relapses, extensions, and mortality, are much alike in both. Extreme and prolonged cold will in rare cases, perhaps, alone suffice to produce cellulitis; in some cases excessive intemperance

and other favouring conditions may produce it with little exposure to cold. The mortality and consequently the progress, are, however, graver in cellulitis of the neck. The closer proximity of serous cavities and important organs explain this.

The treatment of acute cellulitis at the front of the neck is not encouraging in its results. The ailment is so terrible that the customary remedies for inflammation are almost powerless. At an early stage, or indeed at any stage, the free and repeated application of iodine liniment to the chest, back, shoulders, and upper limbs, in accordance with what I may call "my method" will certainly do more good in controlling or diminishing the cellulitis than any other combination of other remedial measures. In the less severe forms of cellulitis of the neck, or elsewhere, counter-irritation over large adjacent surfaces, is the most reliable remedy. When the breathing is involved, or where there is reason to suspect death of deep tissues, an incision in the middle line down to the trachea, as taught by Mr. Bickersteth of Liverpool, is perhaps desirable. I have resorted to it and I shall probably again adopt it, but I am compelled to say that little hope is to be based on it. When gangrenous tissues more or less surround the wind-pipe and gullet, an incision will not save life. I am not sure that, as in some cases of carbuncles, an incision is not the cause of a further extension of the disease, but where death threatens from suffocation we have no alternative.

The general treatment can only be assiduous nourishment, and perhaps iron, quinine, and ammonia, freely given and well diluted. I shall not touch on the question of alcoholic stimulants in the present divided state of opinion. Never-theless, alcohol is still given in the sinking stages of diseases which are actually brought on by alcohol.

PART III.

ENQUIRIES IN THE SURGERY OF THE TRUNK, THORAX, AND ABDOMEN.

EXTRACTS FROM A CLINICAL LECTURE

ON TWO CASES

IN WHICH THE PLASTER JACKET WAS USED.

1. On the Use of Pulley-extension in the Application of a Jacket, or of a Jacket and Jury-mast. 2. A rapid and convenient method of putting on a Plaster Jacket. 3. A simple and efficient plaster Jury-mast.

I show you to day two cases which illustrate a few modifications tending, I believe, to simplicity, ease, and efficiency in the Sayre-Walker jacket. In one case you see a jacket only on a man with caries of the lower dorsal vertebræ, with which is associated a large psoas abscess. The other case is that of a girl with caries and a sharp curve in the uppermost dorsal vertebræ. She has on a plaster jacket, and united with it a plaster jury-mast, and both were put on while pulley-extension by means of a chin-and-occiput sling was being kept up. In this case the pulley was kept on for a week before the jacket and jury-mast were applied. The jury-mast maintains extension and immobility in the head and neck as completely as the jacket keeps up extension and immobility in the trunk. The two are also so continuous and strong that the body cannot be moved independently of the head, nor the head be moved independently of the body. There are three principles in the treatment of spinal diseases which I wish to bring before your notice. They may be considered and applied separately, although in practice they may be frequently used together.

1. The use of a Pulley before and during the application of a Jacket, or a Jacket and Jury-mast.

For nearly two years we have adopted pulley-extension of the spine in the horizontal posture. To a chin-and-occiput sling a weight is attached which passes over the head of the bed, or couch, or table. A bag of shot (or pebbles) allows easy adjustment of the weight as regards comfort and increased length of the trunk. In slight and early cases pulley-extension during the application and setting of the plaster apparatus is sufficient. In severer cases a few days or weeks of preliminary extension may be beneficial. In some cases the weight may be attached to the feet as well as to the head, or the head of the couch or bed may be raised.

I am indebted to my late house-surgeon, Mr. Brett, for the interest he took in combining pulley-extension with the application of jackets. In the case of a girl with dorsal caries, whose jacket was put on with a sliding weight attached to the head and another to the feet, we found that she was taller than she was in a jacket put on under the tripod.

2. A rapid and convenient Method of putting on a Plaster Jacket.

The use of a continuous splint around the body, as introduced by Professor Sayre, will rank with the leading events in the history of surgery. I, for my part, feel also indebted to Dr. Walker of Peterborough for showing how the benefits of a jacket may be secured by putting it on in the horizontal posture, with little assistance, with complete safety, with no cumbrous machinery, and no mental alarm. Dr. Walker uses a many-tailed bandage, consisting of numerous muslin strips; he takes a little longer time, and delays the setting of the plaster by adding gum to it.

The two jackets you see to-day were put on by a simple modification of the Sayre-Walker method. I put on three broad strips only. The strips were compound or multiple, each strip consisting of several superimposed layers of muslin and plaster. In one case honeycomb towelling and plaster were used. When ready to be dipped in water there were practically three rolls. The leisurely application of these three strips did not occupy two

minutes. This rapid process with plaster only and early setting saves much trouble as well as time. One strip is put on round the centre of the trunk, the ends overlapping in front; another strip is put on higher up, it reaches the axillæ, and is so put on that a cone is formed with the base upwards; the third strip is put on below, it reaches the trochanters, and is so arranged that a cone is formed with its base directed downwards. These cones are not formed artificially; they naturally follow the neat adjustment, with moderate traction of the three strips to the trunk. The upper and lower strips well overlap the middle, which latter may be a little wider than the others. The central strip may be put on first or last. The three may be made to fit the trunk like a glove, and they secure double conicity more certainly than do the numerous narrow strips—continuous or many-tailed. The principle of the multiple strips being adopted, the number used in each jacket may be varied—say four, six, or eight. Where the number is greater the width may be narrower. In using these strips it is not essential to entirely cover the front of the trunk. If the splint is continuous and firm at the back a few gaps at the front do not impair the efficiency of the splint, and may indeed have special advantages.
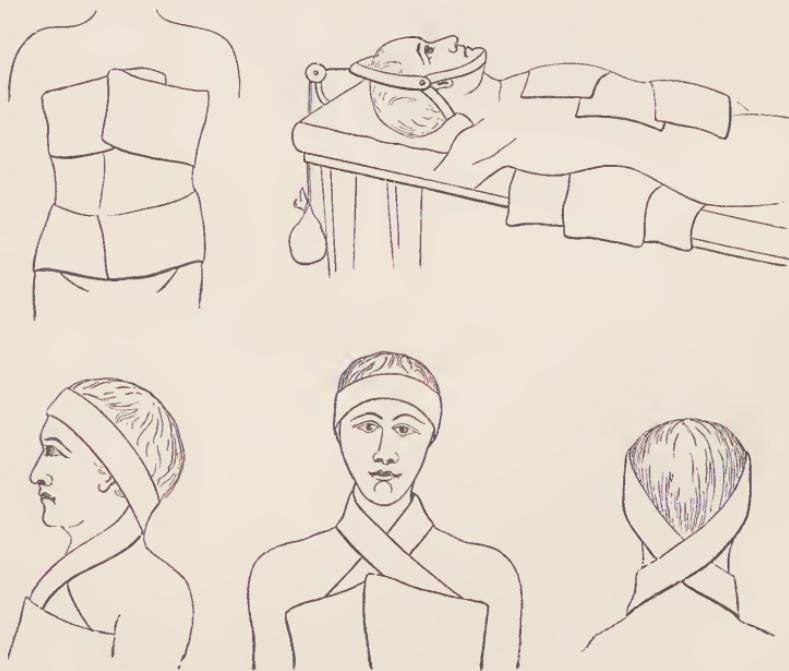
Understand that these three strips may be put on under the tripod as easily as on the bed should the tripod seem to give a better position, and the rapidity, without hurry, of the process is no little benefit when suspension is adopted. If put on in the horizontal posture, the strips are so arranged that the patient is laid down on them; if pulley-extension be used, the multiple strips may be first placed on a sheet of macintosh or paper, and then drawn under the trunk.

I am not yet quite clear which answers best—six or eight layers of checked muslin or two or three of thin honeycomb towelling. The towelling is more manageable, the muslin contains more plaster. If a loop of twine be drawn through the four corners of each strip the whole strip is readily drawn straight and smooth when taken out of water. I may here suggest the utility of these multiple strips as splints in many cases of fracture, diseases of the joints, talipes, &c. The several strips are cut to the desired pattern, filled with plaster, put one on another, rolled up short-ways or any convenient way in one roll, dipped in water a few moments, unrolled and put along and around the adjusted limb.

3. A Simple and Efficient Plaster Jury-mast.

In the case of this girl you see what I venture to call a solution of the jury-mast difficulty. The jury-mast itself is so complete, and is also so immovably connected with the jacket, that the little patient's trunk and head and neck are as fixed as if they were carved out of a single block of wood. We not only turn the head when we turn the body, but when we turn the head we turn the whole body also. If we lift the body we lift at the same time the head without a jar or vibration. The effect is somewhat weird. We could, if we chose, lean her against the wall or roll her along the floor without the slightest movement in any single vertebra. This jury-mast is perhaps stronger than is needful. It is a multiple strip made up of ten layers of prepared muslin; it is fifty-two inches long and two inches and a half wide. The strips may vary from two to three or four inches in width to fisty or sixty in length, according to age, size of head, and length of neck of the patient.

It is put on thus :—The patient is reclining on a mattress with no pillow, pulley-extension is being made with a chin-and-occiput sling consisting of two strips of adhesive plaster to which thin webbing is sewn above the ears. The hair has previously been cut short. The prepared multiple strip in a single roll, after being dipped a few moments in water, is completely unrolled, its centre is then applied to the forehead well away from the eyes, the two ends are next carried along the sides of the head to the back of the neck where they cross—one end being carried under the neck first, then the other (pulley-extension being still kept up), they are drawn firmly enough to closely embrace the head and back of the neck ; the ends are brought forward one on each side of the neck, where they again cross each other in front of the neck and sternum, and lastly the two ends are fastened by a plaster jacket. Before the multiple plaster strip is applied, a flannel strip or long fold of lint is put on in the same way, and a little cotton-wool is put over the ears and in front of the neck. The flannel strip and subsequently the plaster strip are put over the adhesive plaster chin-and-occiput sling, the uncovered portions of which latter may be cut away when the plaster is set.

Again, understand that this jury-mast may be put on during suspension so long as an adhesive plaster sling is used. In cervical caries the use of pulley-extension in the horizontal posture some time before the head is fixed is preferable. In severe cases of cervical disease it would probably be generally admitted that suspension is inapplicable. Whether the pulley-extension be preliminary and prolonged, or temporary, the weight must not be more than that which can be borne with comfort.

I see no reason why this jury-mast may not, in its principle, be carried out in other materials. A long strip of gutta-percha (enclosed in calico before complete softening), or poro-plastic, or wire gauze, well padded, may in some cases be found convenient, especially where much time is needed for careful adjustment. A strip of any material might be conveniently held in place by a plaster jacket.

NOTE ON THE TREATMENT OF EMPYEMA.

THE advantages of the locality chosen by Bowditch for opening the thorax cavity, whether by the needle for pleuritic effusion, or by the knife for pus, seem so clear, that it is curious to hear of examiners asking how the space between the sixth and seventh ribs may best be found, and still more curious, that openings should be made through it. An opening below and in a vertical line with the angle of the scapula, and at a point distinctly above the breathing line on the healthy side is based on anatomical and practical grounds so obvious as not to require argument.

The question whether there should be one or two openings in empyema is not so clear, but I suggest an answer to it, founded on the experience of many cases. A collection of pus depresses the diaphragm more or less. If, when a free incision is made, the finger is passed in, as it mostly may be, and it is found that another inter-costal space lies below the incision, a second opening may be made on the end of the finger. If the opening be already well dependent a second opening is not necessary. If the patient keeps the recumbent posture until he is well, any opening below the angle of the scapula is a dependent opening, and indeed where a single opening is made, it is perhaps better that the patient should be kept in bed a little longer than would otherwise be needful.

The method of keeping a channel open for drainage is important. I find this a convenient one : take a good sized India rubber tube, with suitable openings, and along its interior draw a spiral gilt wire drainage tube. The length of the tube will of course be adapted to the double or single opening. When I introduce my finger through the first incision to see if a second be desirable, I wind a piece of cord (to be ready if needed) round the end of it, if a second is needed, I simply put a pair of forceps through the second opening and draw out the cord from the finger inside. A firm cord readily draws the prepared (rubber

and wire) tube through both openings. In this manner the tube is efficient, self-retaining, and admits of movement and cleansing—withdrawal is unnecessary. The spiral wire prevents compression, and the rubber casing is more comfortable—the two together secure a maximum of advantages. The same tube shorter and with suitable fastenings is also well adapted for use where a single opening only is made.

I refrain from discussing here the question of Listerism. In private practice and with little assistance, a cushion of slightly moist carbolised tow over the tube is convenient and efficient. Capillary attraction for discharges is much more active with moistened than with dry tenax or tow.

NOTES ON DISEASES OF THE UMBILICUS.

Gonorrhœa of the Umbilicus.—I do not remember to have seen any reference to such a condition, but an indisputable example once came before me in the out-patient room. The case was in a woman of thirty; she was perhaps the dirtiest woman I ever saw. She had vaginal gonorrhœa at the same time, and her clothing had probably conveyed the discharge to the umbilicus which was smooth, brightly red, but not ulcerated, and discharging a copious, thick, greenish yellow pus. The surgical moral was this: a cicatrix, and not a recent one, and probably thin portions of skin may become the seat of gonorrhœa.

Condylomata and Warts of the Umbilicus must be rare; a deep, moist, dirty, umbilical scar is an essential foundation for such appearances. I lately saw a case in a young woman in which flat, moist, condylomatous discs existed side by side with the branched gonorrhœal wart. In some of the prominences it was difficult to say which characters predominated, those of the branched wart, or those of the flat condyloma. Gonorrhœa and syphilis were both present on the genitals.

Polypi of the Umbilicus.—I have twice in babies removed by ligature (and with success) finely granulated small polypi, probably originating in granulations and kept up by some obscure source of irritation.

A case of *fistula* in a little girl of four, which I saw with a medical friend, had certain curious characters. Some induration and swelling existed from birth, but during the third and fourth years the child became subject to paroxysms of most violent pain in the vicinity of the umbilicus. The induration at the umbilicus increased in size, became somewhat irregular, and was traversed by a fine, tortuous, fistulous canal. During a paroxysm of unusually severe pain, a little limpid, colourless fluid would escape, and immediately the pain ceased for a time. A probe could be passed, though with difficulty, into the abdomen, and appeared to move freely in all directions. The removal of the indurated mass down to the linea alba, by elliptical incisions, effected a cure after the failure of some milder measures.

ENQUIRIES IN THE SURGERY OF HERNIA.

A Simple Extra-Peritoneal Operation for Strangulated Hernia.

No one will dispute the general proposition that the first principle in the treatment of strangulated hernia is to operate early. To be early is more important than *how* to operate. At the same time it seems a platitude to say that where there is choice of operations, the simplest and safest that will effect the desired end should be preferred.

The rule which should guide us in all cases of strangulated hernia seems clear. Either a given case is one which we desire to reduce by taxis, or it is not. If it is suitable for the use of taxis, and under anæsthesia taxis fails, it is the surgeon's duty to adopt a minimum of operative proceeding which will secure the success of the taxis; if the case is not suitable for taxis, as a matter of practice it will be necessary to open the sac.

We will presume that the surgeon has before him a case in which he resolves to apply the taxis. The taxis fails. Now can any dilemma be more signal than that of the man who applies the taxis unsuccessfully, and instantly arrives at the conclusion that the bowel must be examined. The taxis failed because the stricture was tight, not from any sudden change in the state of the bowel. Let it be granted that in a few exceptional cases the bowel, though previously reducible has formed adhesions, or that the neck of the sack has rapidly become constricted, it simply follows that the extra-peritoneal operation will also fail to ensure reduction by the taxis. An extra-peritoneal operation should always be looked upon as a step accessory to and facilitating the taxis, and especially as a step which, like the unaided taxis, may also fail, and which may therefore need to be immediately merged into the ordinary operation.

In a simple extra-peritoneal operation the wound is comparatively harmless, the peritoneal cavity is not opened, no blood enters it, and the bowel is not handled; all this is reversed when the sac is opened.

Perhaps the readiest way of deciding when to adopt an extra-peritoneal method is to glance at the cases where it is not suitable. If the taxis is inapplicable an extra-peritoneal method is certainly inappropriate; where the sac and contents are clearly inflamed, and especially where the bowel is gangrenous, as it is when the sac is not well defined, and the cutaneous coverings are œdematous and red, where pain has ceased, and general shock is marked—opening the sac is the only alternative. In the strangulation of the usually irreducible umbilical herniæ of fat women, a special operative method elsewhere described is perhaps the best. In most other cases, in short in all cases where the taxis is appropriate, the extra-peritoneal may be used to help it when it fails. When both fail the sac must be opened.

Several years ago I described a method of operating which is limited in extent—leaving the two or three innermost coverings uninjured, and which is quickly and readily performed. During the years that have elapsed since the

publication of my method I have constantly adopted it with a growing belief in its simplicity and efficiency; at the same time I have always kept on the watch for any better method. The operation pre-supposes that the operator is familiar by touch with the anatomy of the parts concerned in hernia. The principle of the operation is this: make an incision through cutaneous structures near the neck of a given hernia, of such a size that the finger may be freely passed into lax connective tissue, the finger can then be insinuated to the firm margin of the hernial outlet; pass now a hernia knife along the finger, slightly incise the given margin and reapply the taxis. It is the cutaneous structures which mainly interfere between the surgeon and the special hernial structures. *Put the finger through the skin* and the greater difficulties are overcome.

The details of the operation consist in the application of the principle now proposed to the various hernial sites. The operation just sketched, like all extra-peritoneal operations, is most applicable to femoral hernia, and for the simple reason that femoral hernia passes through a ring merely, while inguinal hernia passes through a tube. In this variety of hernia the small cutaneous incision is made vertically as nearly as can be over the margin of Gimbernat's ligament; the fore finger passes at once along the inner side of the movable hernial globe to the fixed fibrous margin at its inner side; this is notched sparingly inwards with a hernia knife, and the finger firmly presses against the incised margin so as to gain by pressure and gentle dilation the fullest advantage of the incision. It is wholly needless to divide every flake of connective tissue down to Gimbernat's ligament; it is enough that the finger-nail reaches the constricting margin with ease and certainty—this margin may be Gimbernat's ligament, or a part of the saphenous opening, or both merged into one. In the great majority of cases, a moderate and brief application of the taxis reduces the hernia. Should the taxis again fail, the cutaneous incisions must be extended and the sac opened, when it will be found that the neck of the sac is constricted and rigid, or that the

contents are adherent, or that some omentum has increased in size or as assumed a shape which prevents reduction.

In inguinal hernia, where the sac is well defined and free from signs of inflammation, my method may be tried as a preliminary step. In a goodly number of cases it will succeed, and if it fails it is merely the harmless beginning of the larger and ordinary operation. The fixed immovable neck should be made out with great care, and the button-hole for the finger made directly over it. The constricting margin should now be sought for and divided upwards, pressure on the incised margin, gentle dilation, and taxis follow. The practical difficulty in inguinal hernia lies here: a firm, compressing margin (external ring or internal oblique say) is felt to be apparently the seat of stricture when in reality it is not so—the real constriction being still deeper, as at the internal ring. When the inguinal canal in such cases is densely packed, and the surgeon's finger perhaps not very small, it would be better to open the sac at once. It is true the canal has still the same contents, and the finger is still as large, but the pathway is smoother, clearer, and lighted up. With a small finger, a sensitive finger-tip, and an experienced hand, even deep strictures may not rarely be reached and divided, but in all such cases if the taxis, moderate in energy and time, does not reduce the hernia with ease and gurgling, the sac should be immediately opened.

In both femoral and inguinal hernia it is sometimes found that reduction fails after the operation has been performed, in consequence of thread-like bands which surround the neck of the sac externally, and which have been probably torn from the margins of the fibrous opening by too vigorous efforts at the taxis. These should be sought for by the pulp of the finger (see Plate VII., Figs. 5 and 6), when found, the finger nail and the herniotome readily deal with them.

It is a curious circumstance to be remembered in all methods of dealing with strangulated hernia, that the relationship between the size of a hernial outlet and its

contents is a very variable one. Sometimes the opening is so large that it is difficult to understand that strangulation exists; in other cases mild symptoms accompanying the tightest constriction; sometimes reduction is difficult, before or after an operation with a large ring, and sometimes easy with a small one.

The Treatment of Strangulated (previously) Irreducible Hernia.

This is guided by principles less clear than those which regulate our conduct in the management of strangulated (previously) reducible hernia, or in the management of gangrenous bowel. If we divide the fibrous structures external to the sac, we have not the same test of success in effecting reduction of the hernia. The strangulation of irreducible hernia is due to a fresh descent of bowel, and we cannot be quite sure we have reduced the newly descended portion, or indeed that the stricture is not in the neck of the sac. In exceptional cases only we may feel confident we have returned a portion, when it would be well to defer any operation for a time. Three methods suggest themselves in these cases: the common one of opening the sac and dividing the stricture in the ordinary way; an extra-peritoneal method on the presumption that the stricture is *not* in the neck; or a method similar to that about to be described as useful in strangulated irreducible umbilical hernia. Here an incision is made just large enough to admit the finger through the covering of the hernia and a little remote from the neck; the finger is carried to the stricture and a herniotome is carefully guided along it. Newly protruded bowel or omentum should be returned with as little manipulation as possible. As a dressing, the constantly moist, soft, antiseptic sponge is of great service in such cases.

It is easy to conceive cases (previously reducible or irreducible) where if the fibrous constriction being first divided externally to the neck of the sack, a subsequent limited incision into the sac away from the neck would

PLATE VII.

Fig. 1 shows use of écraseur, through incised nostril, in fibrous polypus.

Fig. 2 suggests occasional possibility of removing a necrotic fragment in spinal caries with lumbar abscess.

Figs. 3 and 4. Sectional views of partial pendulosities of the abdomen after repeated pregnancies.

Figs. 5 and 6 show the detection of fibrous bands in the extra-peritoneal operation for hernia.

Fig 7. Sectional diagram of a simple plug for rectal hæmorrhage.

PLATE VII.

Fig. 1.
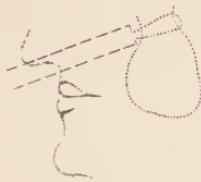
Fig. 2.

Fig. 3.

Fig. 4.
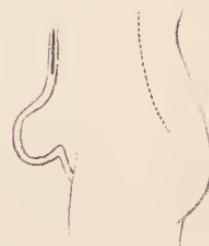
Fig. 5.
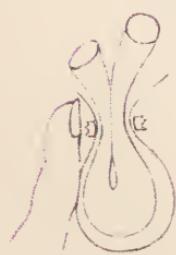
Fig. 6.
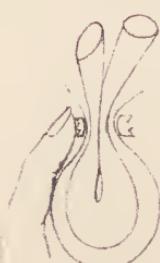
Fig. 7.
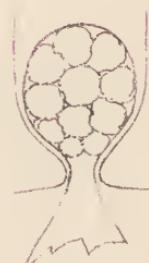
enable the finger to dilate the neck—if it should prove to be needful—without any incision in it; a proceeding that would at any rate prevent the entrance of a single drop of blood into the abdominal cavity. In femoral hernia for instance, after failure of the taxis and failure also of the extra-peritoneal method, a small incision into the body of the sac would permit the finger to reach the neck, and probably (now that the fibrous structures no longer compress it externally) to dilate it so as to secure a successful taxis.

The Treatment of Strangulated Umbilical Hernia.

The treatment of this variety of hernia which is mostly also irreducible is always a question of anxiety. The extra-peritoneal operation, from the thinness of the coverings and their close proximity to each other is scarcely expedient. The ordinary operation of freely opening the sac is very fatal. A few years ago it occurred to me and to one, if not two, Edinburgh surgeons simultaneously, to give the operation more of a subcutaneous character. A small incision is made over the body of the sac, just large enough to admit the finger which is insinuated through the contents to the neck, in the upper margin of which a small incision is made. I have now in four cases operated by this method, and in three with successful results. In one pregnancy was present which went on its natural course; in another all the bowel was reduced, only omentum was left, which of course contributed to a favourable result. In the fourth case, in a very fat Jewess, some bowel was reduced, and the skin was curiously superficially ulcerated, but recovery followed. I have several times seen extensive superficial ulceration over the umbilical sac, in two fæcal fistulæ existed, yet both recovered without operation of any kind. This ulceration does not seem to be caused by any particular dressing, but rather by tension and impaired nutrition of the cutaneous coverings. In the fatal case inflammation extended from the sac to the abdomen. Curiously enough an idea which I had for some time entertained, occurred also to Mr. Annandale. When I was unaware of Mr. Annandale's views, I wrote in the first edition of this

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work as follows :—" I have some times thought that a very small incision in the linea alba above the hernia might permit the finger to reach the abdominal aspect of the umbilical hernia, and draw back into the abdominal cavity the last protruded intestinal coils the expulsion of which had given rise to strangulation. If this should prove impossible, an appropriately curved herniotome would make precisely the same incision as could be made from the sac side of the structure. I am not sure that such a proceeding might not be occasionally of service in the more complicated herniæ of the lower part of the abdomen." Mr. Annandale has recently recorded a case in which he put the proposal into operation, and although the case proved fatal, other conditions existed which sufficiently explained the result. In strangulation of old and clearly irreducible herniæ, whether femoral, inguinal, or umbilical, my experience leads me to give a general preference to the operation which consists in making, at first, a very short incision into the body of the sac as already described, and in adding other steps as may be needed.

Note on Apparently Irreducible Hernia.

It is well to note that the mere fact that a hernia has been unreduced for a long time is not in itself sufficient evidence to prove that a hernia is really irreducible. This remark is especially applicable to women and timid men. A case which I will briefly report impressed this very strongly upon me. I was called by the medical adviser (also a relative) of a maiden lady of about forty, to confer with him on her condition. She was suffering undoubtedly from strangulated femoral hernia. The hernia was naturally regarded as irreducible seeing that it had been uninterruptedly " down " for seven years. I divided the margin of Gimbernat's ligament without opening the sac—making, indeed, only a sufficient incision in the cutaneous structures to permit the finger to reach the ligament. All I hoped to effect was the relaxation of a fibrous margin of the femoral ring, and, perhaps, the return of some newly discarded bowel—the protrusion of which had probably given rise to strangulation. To my

great surprise, and in some degree to my alarm, I was able by the taxis to reduce with ease, and with " gurgling," the whole hernia. I say alarmed, because I feared that the bowel that had been outside the abdominal cavity for seven years would cause some irritation or disturbance when it was once more put inside. Fortunately no uneasy symptom of any kind followed. Now I cannot help thinking that a firm and intelligent hand could at any moment in the seven years have reduced the hernia. Clearly there were no adhesions; but it may be said that the size of the abdominal outlet was too small to permit reduction. I cannot think it was so in this case, though I do not deny the possibility of such a condition. An opening which permits ready transmission of fæces, and sets up no disease or adhesion, would probably have permitted reduction by a trained hand.

A Suggestion for the Radical Cure of Hernia.

Much and varied ingenuity has been shown in efforts to radically cure hernia by closing its outlets. Unhappily no single method has been commonly or permanently successful. Had success been possible on the principle of closing the hernial openings Mr. Wood's great ingenuity would certainly have secured it. Too many surgeons strive to improve what is already easy and successful in surgery; to Mr. Wood belongs the credit of grappling with real surgical difficulties such as the radical cure of hernia and the operative relief of extroversion of the bladder.

In obstinate and difficult cases of hernia we find, as is well known, that the abdominal cavity becomes relatively too small for its contents. Especially does this happen at the age when fat begins to accumulate within the abdomen. If a man were to come to me with a hernia which no kind of truss could keep up, and which was at the same time more than ordinarily liable to strangulation, I should be prepared to adopt an entirely new principle in the radical cure of hernia. I would enlarge the cavity of the abdomen. Why not enlarge it by forming a partial pendulosity, seeing that pendulosities, though possibly troublesome, are less

troublesome than herniæ, and are safe from the dangers of strangulation? I would divide the recti muscles near, or close to, the pubic bone. Here the transversalis fascia and subperitoneal fat are thick and would confer complete safety on the operation. I am not sure that it might not be preferable to divide the inner pillar of the inguinal ring. With a finger in the canal might it not be possible to do this subcutaneously after the manner of tenotomy? More or less bulging would assuredly follow. For the hernia is substituted a pendulosity, inconvenient it may be, but not dangerous. Now in making this proposal I am not reasoning on fanciful bases. I have seen several women after pregnancy or pregnancies presenting *partial pendulosities of the abdomen*. Some of these have been of extreme size. Some have been vertical widely separating the recti, others have been large transverse pouches between the umbilicus and the pubes, bulging just below the falciform edge of the posterior wall of the sheath of the rectus. These pendulosities are the salvation of child-bearing women. They take the place of hernia and *under no circumstances are they ever strangulated*. With or even without abdominal belts, these women do a great deal of hard work. (See Plate VII., Figs. 3 and 4.)

FATTY CHANGE (AND FAILURE) OF THE MUSCULAR WALL OF THE GUT, AS A DIRECT AND INDIRECT CAUSE OF INTESTINAL OBSTRUCTION AND DEATH.

FOR several years past, I have from time to time seen cases in which, with perhaps no premonitory symptoms, continuous vomiting and tympany, lasting one, two, or more days, have been followed by death. While these symptoms appeared in some cases to come on spontaneously, in others, and I think more frequently, they followed some abdominal or pelvic operation. The cases, as a rule, happened in fat persons, in persons with large abdomens, in persons with

signs of degeneration in various organs and with a history of habits which naturally lead to visceral changes. Examination of the bodies disclosed great internal accumulations of fat, and occasionally indications of visceral degeneration, but, curiously, no obvious or recognised cause of intestinal obstruction. In all the cases, the intestinal canal was greatly loaded with fat, and presented a strikingly yellow appearance; in some cases, indeed, it seemed to be simply a tube of fat. In one case, the microscope conclusively showed that the unstriped muscular fibres of the bowel were converted into fat. In observing and reflecting on these cases, of some of which I shall speak later, I have arrived at the following conclusions.

1. The smooth muscular fibres of the bowel are subject to fatty degeneration which may become more or less complete; and that, consequently, they may, and do in given cases, wholly cease to contract.

2. This fatty change of the essential element of the gut-wall, when it ends in complete cessation of contractility, causes death by intestinal obstruction. Fatty failure of the intestines being in some cases extensive in area and reaching high up towards the stomach, the ensuing obstruction is acute, the vomiting incessant, and death early. In other cases, there may be less complete, or more limited, or irregularly distributed fatty change; and there will follow a slower or more fitful stream of symptoms and a later death.

3. Fatty transformation in the gut is more likely to appear (though perhaps not exclusively) in fat, especially very fat persons; in those who, from habits or natural tendency, are liable to have fatty degeneration of other organs, especially of the heart. Death in heart-cases is quick and direct; in intestinal-cases slower and more indirect but nevertheless very certain.

4. As premonitory syncope or exhaustion may happen from time to time before death from heart-fattiness, so "attacks" of obstruction may run before final obstruction from intestinal fattiness.

5. Failure of the bowel is helped on by continued flatulent distension, however it arises; the altered muscular fibres being so injured by over-stretching that they never regain their functional contractility. Herein may be traced a likeness to atony of the bladder, where, it is well known, long-continued distension is in certain cases followed by entire loss of contractility; and it is not unlikely that fatty conversion of the muscular wall of the bladder is the basis of certain obscure cases of retention and cystitis coming on after middle age. It is conceivable that healthy gut may become the subject of fatal atony from long continued stretching; but some, however slight, fatty change would greatly favour such a result.

6. In a limited number of cases, death is due directly to failure of intestinal action, and may come without obvious exciting cause. The muscular fibre is now no longer muscular. In a larger number of cases, death comes more indirectly from some immediate shock to the abdominal organs. In strangulated hernia, when fatty bowel is present, the blown-out tube never again contracts. The vomiting continues, or returns and death follows, notwithstanding that reduction has been easy and complete and that there is no inflammation, or gangrene, or other cause of death. All injuries and operations in persons with failing gut are liable to be followed by vomiting, which ceases only with death. Especially is this so in operations on the abdominal or pelvic organs. Herniotomy and lithotomy are now and then followed by fatal vomiting, and subsequent search brings nothing to light; no injury to the peritoneum, no hæmorrhage, no inflammation, no other lesion; nothing but a hugely distended bowel.

The cases which led me to believe that, in certain instances, death begins in the gut from entire cessation of action in the intestinal muscular fibre, and that the cessation was due to fatty degeneration, I now briefly cite.

Several years ago, a lady so stout that she had long been confined to her room—the staircase of her house was also narrow and awkward—without any previous complaint,

began to vomit. The vomiting, at first occasional, became incessant and fæcal in character, and she sank in two or three days. I examined the body. The intestinal canal was from end to end enormously distended with gas; but there was nowhere any localised obstruction of any kind. The bowel was strikingly yellow in appearance; and the amount of fat, not only on the body, but within the abdomen, could only be described in words that would savour of caricature. After the most careful examination, no other appearances could be found to account for death.

Another case, which made a vivid impression on my mind, was that of an exceedingly stout man. He got out of doors a little in a specially made phaeton with a bottom so low that it just cleared the road, and was reached with one short step. Without injury or premonitory incident of any kind, symptoms of intestinal obstruction (sometimes urgent and sometimes with intervals of ease) set in, and in a few days he died. A very yellow distended bowel was seen; indeed, I remarked in this case, as I have in others, "The bowel seems to be a tube made of fat." The distension was not uniform, but more in some coils than in others. There was, however, no band, or twist, or stricture, or cause of obstruction of any kind. I had not yet concluded that death might be caused by fatty failure of the gut. I was merely suspicious, and afraid that it might be so, or I should have called in the aid of the microscope.

In a case of strangulated hernia in a very stout man, the bowel was reduced easily and with marked gurgling, and for a few hours he seemed better; but vomiting returned, and he died. On examination, no inflammation, or gangrene, or apparently adequate cause for death, was found. The abdominal organs were greatly loaded with fat. The heart was somewhat softer than natural. The extreme yellowness of the bowel so struck me, and my reflections and fears had now taken so clear a shape, that I determined on a microscopical examination of the muscular fibre of the bowel. This was carefully made for me by an experienced microscopist, Dr. Wood (one of our staff), and left no doubt of the marked

fatty change in the suspected structure.   Dr. Wood did not content himself with the appearance of the fatty intestine; he examined portions of healthy intestine, and found a striking contrast.

Not long ago, I had two cases of lithotomy, both of which ended fatally within twenty-four hours, after several hours of incessant vomiting.   The cases were singularly alike, and a description of one will serve for both.   A big fat "drinking" man of sixty had enlarged prostate and a large vesical calculus.   There was no tangible evidence of renal or other visceral disease.   There was no peculiarity in the operative steps to account for the result.   I could not to-day alter any single step in the operation—the ordinary lateral—for the better. He was free from haemorrhage or marked shock.   His condition for a few hours was quite comfortable; then occasional vomiting set in, and tympany of the abdomen appeared.   The vomiting became frequent and was associated with great exhaustion, and ended fatally.   In a subsequent examination, a description of the appearances would answer for both bodies. The internal organs were loaded with fat; the heart was somewhat pale and soft; and the kidneys were not healthy.   The intestinal canal was singularly and uniformily yellow, and everywhere enormously distended.   There were no signs anywhere of inflammation, or peritoneal injury, or extravasation of blood, or infiltration of urine.

I believe the operation here destroyed the vitality, so far as contractility was concerned, of the bowel.   Flatulent distension followed, and irretrievably spoiled the gut.   This condition, affecting all or a large portion of the canal, and affecting it even to the vicinity of the stomach, was practically a condition of acute, high-up, and complete obstruction.

Here the question naturally arises, What are the customary explanations, now and heretofore, of the causes of death after continuous vomiting which follows the reduction of strangulated hernia, which follows also operations for uncomplicated herniæ, which follows lithotomy and other operations on the pelvis and abdomen?   The very variety of the explanations testifies to their improbability.   One says

shock; another says shock with feeble heart; another says
ether or chloroform vomiting; another says rapid septic
poisoning; another says incipient peritonitis. I am far from
saying that these, or some of them, are inadequate causes
of death under certain circumstances; but they do not
satisfactorily account for death in the cases I bring forward·
In pure shock, with or without cardiac degeneration, vomit-
ing is rare; in cases of, say crushed knee-joint, or
amputation at the hip, or even in severe abdominal injury
(in healthy persons), nervo-muscular action dwindles down to
death without vomiting. That ether or chloroform vomiting
should recur after some hours of comfort is at least
hypothetical; hypothetical also is rapid septic poisoning
without rigor, or rise of temperature, or any other likeness
to the known septic state. Peritonitis without the slightest
sign of peritonitis is too metaphysical a pathology to grasp.
In fatty change and consequent failure of the gut, we have
an explanation which is based on clinical and microscopic
observation, which clears up all difficulties, and which is
consistent with known pathological laws.

A CLINICAL LECTURE ON
IDIOPATHIC GANGRENOUS CELLULITIS
IN THE PERINÆUM.

I show you here a rather notable case. It is the least
grave example of idiopathic cellulitis in the vicinity of the
rectum I have seen. It is the first I have seen in a hospital,
such cases occurring, as a rule, in the well-to-do; but our
patient is a commercial traveller, so situated that hospital
accommodation is a necessity to him. The more marked
features of his case are those which are found in a class
of cases of which I have seen a few remarkable illustrations
in the private practices of my medical friends.

This man is of immense size, tall, stout, and weighing
above twenty stones. He is excitable and active, and has
been worried of late with reverses. He eats largely and

drinks deeply. He has been much exposed to cold and wet, and, after more than usual exposure, he came in with a big swelling on the left side of the anus, extending outwards to the tuberosity, forwards to and across the perinæum, and backwards to the sacrum; it was pale, hard, and painful. Fever and extreme prostration were present. Iodine liniment was freely applied in large patches to the neighbouring skin. Incisions were also made into the swelling, and revealed most strikingly a large black mass of dead tissue, without any suppuration. There have been slight relapses, but in each relapse the black masses have become smaller. There has been no suppuration, and death has been confined to cellular tissue.

This typical but mild case (mild, I believe, from early and active counter-irritation) suggests several topics for brief comment. The disease is essentially idiopathic. A kind of creeping cellulitis, not attended with much swelling, in rare cases, follows operations on the pelvic structures. In this and in other cases which I shall briefly cite, there had been no operation and no injury.

The few cases I have seen have been in big, heavy, middle-aged men; in men of continual activity and excitable temperament, always working, or travelling, or eating, or drinking; in men who combined two bad habits—eating much and drinking much; in men sufficiently wellto-do to indulge at will, and who firmly believed that excess of work needed excess of victuals and liquor; in men who were indifferent to weather, and had been notably exposed to cold and wet. All the cases I have seen occurred in cold weather, and I believe they are more frequent with us in the exposed high table-land of midEngland. It is not probable that all the favouring conditions, which have been combined with singular uniformity in my cases, will always be found together. Some causes may be powerful, others feeble, others absent. Probably idiopathic cellulitis occurs in men, chiefly because men combine the several conditions which lead to it. Freely drinking women rarely eat excessively. It is a matter of wonder, not

confined to the public, that "drinkers" should live so long, seeing that they frequently take so little solid food.   In truth, they live so long because they eat so little.   Singularly little food supports the adult.   Take much food, and at the same time check metamorphosis with copious alcohol, and you lay a train for very certain pathological explosions.   One of these explosions, and a dangerous one, is cellulitis around the rectum.   The pale, hard, slightly lobed, extremely prominent swelling projecting between the big buttocks of a big man is not easy to describe.   It may begin anywhere in the vicinity of the rectum—around the tube or near the surface; if it begin deeply, it quickly comes to the surface; if it begin under the skin, it soon extends deeply.   Its deep position is sometimes known by the effects of pressure, as on the sacral plexus.   In one case I had difficulty in believing that actual paraplegia was not present.   It is only fair to say that his regular medical attendant (an able member of a hospital staff) could see nothing more than extreme prostration.   In a somewhat similar disease—cellulitis of the neck—I have known paralysis of one arm appear a day or two before the dense collar in front of the neck.

The progress of the disease is very rapid.   The skin over the swelling, if not cut by the surgeon, quickly melts away, and discloses a mass of dead, black, fœtid tissue, but as a rule, little or no suppuration.   Should pus appear, it is scanty and fœtid at first; at a later stage, when the sloughs separate, there may in some cases, be free suppuration from the large granulating surfaces.   The slough comes away rather slowly; a cavity, usually of extreme size, is left, which closes tardily, and leaves, curiously, no fistula, as does the ischio-rectal abscess.

The gravest feature in the progress of these cases is the great tendency to relapse or extension, or both.   The cellulitis tends to run rapidly on the surface to the thigh, buttock, perinæum, or scrotum, or it runs into the pelvis, reaching the bladder, or even the peritoneum.   Cellulitis, closely followed by gangrene, may, then, suddenly extend in possibly fatal, and always dangerous, directions.   Here (see

Plate VIII., Figs. 1 and 2) are diagrams of cases which I have seen, in conjunction with medical friends, to several of whom I am much indebted for notes and suggestions. They are merely suggestive, but they save many words.

One diagram (see Plate VIII., Fig. 1) is based on the case of a huge man, a bricklayer's foreman, who ate a pound of meat thrice daily, and drank spirits at a similar rate. In a drunken fit, he sat the whole of a cold November night on a doorstep. A swelling so large in a man so big I had never seen. After a few days' illness, with severe pains extreme prostration, and high temperature, peritonitis set in, and he quickly sank. An incision (persistently refused for some days) showed an enormous mass of black gangrenous tissue, stretching into the pelvis beyond the reach of the finger. There was no suppuration. His family adviser—himself an able hospital surgeon—in a note about the case, used the just expression, " gangrenous cellulitis."

In another case, where the build, habits, and exposure were such as I have described, the family adviser told me that the rectal cellulitis was preceded by pains in the limbs, vague in locality, but so severe that the man's shouts could be heard in the street. Here the skin, no knife being used, rapidly disappeared, disclosing a large black gangrenous mass. While this was slowly coming away, sharp bladder symptoms set in—cystitis, more or less retention, and the formation of a large abscess near the neck of the bladder, which burst into the urethra. For some time, pus and mucus appeared in large quantities in ammoniacal urine. The convalescence was extremely tedious, but ultimately, under the skilful guidance of his family physician, the parts healed and left no fistula.

Yet another example, in a large manufacturer, an ex-mayor, the leader of his political party in a Worcestershire town where political feeling runs high; who kept " a good table," and who was " never at rest." After a formidable cellulitis in the vicinity of the rectum, especially between the rectum and the sacrum, he appeared to be slowly recovering, when suddenly, with a return of high temper-

ature and prostration, a crepitating swelling was found under the left larger gluteal muscles; when this was opened, my finger readily passed to the sacro-sciatic opening in one direction, and the capsule of the hip-joint in another. Beginning at the lower part of the rectum, the cellulitis, during a relapse, ran upwards inside the pelvis, but fortunately turned at a right angle through the sacro-sciatic opening, and came outside the pelvis again in the gluteal region. (See Plate VIII., Fig. 2.) Several grave incidents occurred in the progress of this case, upon which I cannot now dwell. One of these was alarming hæmorrhage from the seat of the cellulitis through previously made openings, which the family adviser ingeniously checked by using a Barnes' dilator in the rectum. Another was the appearance of a pleuro-pneumonia of most threatening aspect, but which, happily, kept within circumscribed limits. Recovery followed by very slow steps. Many medical friends and advisers, including an eminent Birmingham physician, were in attendance, and doubtless all helped to save a life which for some time trembled in the balance.

Shortly after the publication of the above cases in the *British Medical Journal*, Mr. Vincent Jackson, of Wolverhampton, recorded an interesting case which is given below· The peculiar feature in the case is its occurrence in very hot weather, and it further illustrates the principle previously laid down, that if some of the favouring causes are very powerful, others may be absent. The query suggests itself here as in other cases—does the pressure in the sitting posture under some circumstances suspend the circulation and vitality of a certain area of tissue? or is thrombosis induced and thereby vitality impaired? In certain states of health a small patch of dead or even altered tissue might prove the centre of an extensive and spreading cellular and gangrenous inflammation. "Ischio-rectal gangrenous cellulitis is, in our experience, so rare a disease, that as a contribution to the subject, I am desirous of supplementing the cases of Mr. Furneaux Jordan, by recording the only one I have seen."

" On the evening of June 27th, 1878, I was requested to visit a gentleman who had just arrived from Windsor. I learnt that my patient, previously the proprietor of a large hotel, was engaged upon the turf, and regularly attended all the important race meetings throughout the kingdom. He was a large-made, full-blooded, and well-to-do looking man, never intemperate, but living upon the best, eating of everything in season, drinking champagne and claret-cup, and now and then enjoying port wine and nuts.

" The weather was intensely hot, and he had been much exposed to the sun's rays, which, producing a feeling of fatigue, had induced him to sit down on a very hardbottomed chair two days previously. At the time, he felt pain on the left side, between the ischial tuberosity and the anus ; hardness soon followed the pain, both being accompanied with a feeling of great *malaise*. Upon examination, I found pyrexial symptoms well marked, a distressing one being intense frontal headache; the local trouble was shown me. I observed that the soft parts between the anus and the left tuber ischii were swollen; to the eye, the skin was shining, red in its centre, and to the feel it was tense and hard. The bowels had been, by medicine, freely relieved; the urine, which was not abundant, was loaded with pinky-brown lithates, but it was free from albumen and sugar. My advice, of having a free incision made into the brawny tissues, was not followed, although I carefully explained the good that it would do, and the dangerous harm that it might possibly prevent.

" The next day, everything was worse. The patient had not slept; the pain, before great, was now torture. He said he was sure he was mortifying. The swelling and hardness had much extended; the red spot was now a black one, and its large areolar was of a dusky red colour. As soon as it was possible, ether was given, and a large incision exposed a gangrenous mass of cellular tissue, and let loose an ichor of a most putrid but non-feculent odour.

" The daily notes of the case it is unnecessary to report. Suffice it to say that he battled bravely for his life; that

on five different occasions, for as many relapses, he took
ether for the purpose of having incisions, neither short nor
superficial, made in the neighbourhood of the first one ; and
that finally, six months after the commencement of his illness,
he was well, the wounds having all healed, no fistula resulting."

The perusal of the above cases, mine and Mr. Jackson's,
led Dr. Blaikie Smith, of Aberdeen, to publish in the *Lancet*
the following case. It is so characteristic that I give it
here in Dr. Blaikie Smith's own words. It shows that the
disease is not confined to one district, and therefore it is the
more remarkable that, so far as I know, there is no
reference to it in surgical literature.

" Towards the end of March, 1877, I was in attendance
on a gentleman suffering from delirium tremens. He was
upwards of forty years of age, of large and stout build,
and for many years had led a most intemperate life. From
past experience of this patient, I had learnt that nothing
was of such service to him, when suffering from delirium
tremens, as large doses of morphia injected under the skin ;
and accordingly this remedy was freely used for a day or
two, with the result of alleviating all his symptoms.

" On March 23rd he complained that when he got up to
pass water it came with difficulty—a symptom which was hard
to understand, as a careful examination of his urinary organs
failed to elicit any cause for its occurrence. The only theory
I could entertain was, that the morphia which had been
administered was exhibiting in the person of my patient one
of its physiological actions. Next day, however, threw more
light on the matter, for he now began to complain of pain
near the right verge of the anus, where the skin was found
on examination to be swollen, hard, slightly red, and tender—
a state of matters which led me to suspect a different cause
for his difficult micturition. My suspicions were amply con-
firmed on March 25th, on which day the swelling increased
largely; and was accompanied by much pain, radiating to the
coccyx and loins. Defecation, as well as micturition, was
now both difficult and painful. The temperature reached 102·4°.
Three days afterwards the swelling had involved the whole of

the perinæum to such an extent that the anus could not be seen. The skin was for the most part of a livid hue, hard and unyielding to the touch, with vesicles on the surface here and there; but in the right ischio-rectal region the lividity had deepened into a darker colour, and the unyielding feeling had given place to a crepitating softness. In a word, gangrene was present. Free incisions accordingly were made on both sides of the perinæum, resulting in an enormous escape of gangrenous débris, attended by an intolerable fœtor from the wound on the right side. The finger passed into this wound discovered a cavity so large that its size could not be made out exactly. The cellular tissue on the left side seemed little affected, and the rectum was free from disease.

"From this date onwards (March 28th), every effort was directed to support the patient's strength, and promote the separation of the sloughs, by stimulants, opium, suitable nourishment, and antiseptic injections; but the spreading nature of the affection was not to be gainsaid. On March 29th both sides of the scrotum were attacked, and incisions therein gave vent to much gangrenous matter. By April 2nd, the skin covering the right lumbar, right iliac, and suprapubic regions of the abdomen had become livid and emphysematous, and a sloughing sore made its appearance at the upper and inner aspect of the right thigh, two inches below Poupart's ligament. The fœtor arising from the sloughs was now almost overpowering, filling the whole house, nor did disinfectants, though used lavishly, seem to have much effect in abating the evil.

"Little more remains to be told. The cellulitis of the abdominal wall continued to spread, and with its extension my patient's strength gradually failed, till, on April 4th, he died exhausted in the struggle with this most loathsome disease.

"The case just recorded is similar in many ways to those narrated by Furneaux Jordan and Mr. Jackson. The disease occurred in an intemperate stout man of middle age, who (and this I have not mentioned before) had twice during the last ten years of his life suffered from perineal abscess, the second attack of which had left in the right ischio-rectal

PLATE VIII.

Figs. 1 and 2 suggest (from cases) direction and extent of gangrenous cellulitis, beginning in or near ischio-rectal fossa.

Fig. 3 suggests (from case) area and direction of cellulitis of neck.

Fig. 4. Diagram of longitudinal division of rectum in stricture.

Fig. 5. Diagram of congenital encysted hydrocele of cord, communicating with the abdomen.

Fig. 6. Water bottle hydrocele of cord.

PLATE VIII.

Fig. 1.
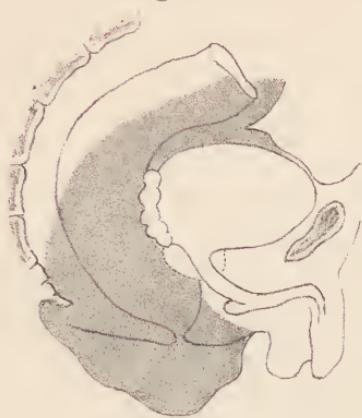
Fig. 2.
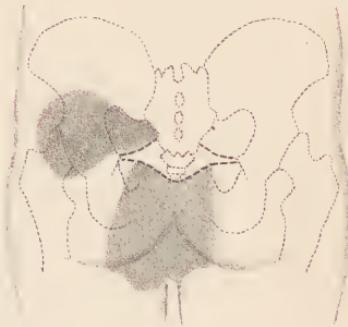
Fig 3.
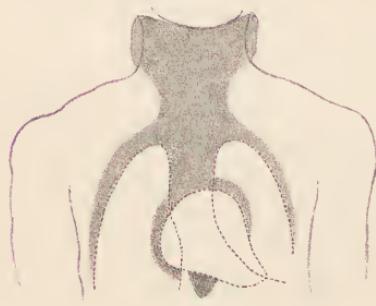
Fig. 4.

Fig. 5.
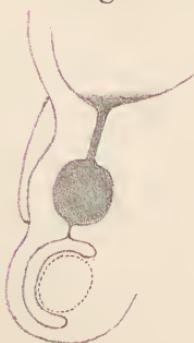
Fig. 6.
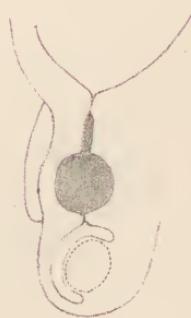
fossa a small sinus, which discharged a little pus from time to time. Is it possible that this vulnerable spot in the perinæum induced what Mr. Jordan so aptly calls an "explosion" of the disease in that situation in preference to any other? I think so; and will be interested to hear if others have noted a similar connection in any case of spreading gangrenous cellulitis which may have come under their notice. Throughout the progress of the case the rectum and urethra were unaffected save by pressure, and the urine was free from albumen."

EXTRACTS FROM CLINICAL LECTURES ON DISEASES OF THE RECTUM.

On a Case of Destruction of the Rectum, followed by Cicatricial Occlusion of the Bowel above, completely relieved by Colotomy.

The woman you have just seen, whose age is about thirty-eight, was placed under my care by my colleague Professor John Clay. I will give you a brief history of her case. Several months ago, she had a confinement so difficult and so prolonged, that it was followed by sloughing of the entire rectum. The pressure of the child's head had been directed persistently backwards in such a manner as to destroy the vitality of all the parts between it and the cavity of the sacrum. I put the matter somewhat compendiously, because, having no obstetric experience, I do not pretend to give you any obstetric details. The vesico-vaginal septum escaped serious injury, so that, although there was incontinence of urine for a time, she subsequently regained control over the bladder. I need scarcely tell you that, in consequence of the contracted state of the sphincter ani, the fæces came away through the larger and more patulous outlet of the vagina. The frequent and involuntary escape of fæces and flatus made her state sufficiently distressing; what it was before she became able to hold her water I will leave you

Q

to imagine. Greater troubles, however, were to follow. Symptoms of chronic intestinal obstruction arose. These gradually increased, and her condition becoming one of great gravity Mr. Clay was consulted; and when I saw her, at his suggestion, there had been complete obstruction for fourteen days. On examination, the finger entered a cavity formed by the anterior wall of the vagina in front, and by the sacrum behind. At the upper and back part of the space was a dense, irregular, cicatricial mass in front of which the uterus was situated.

The poor woman was in a state of great exhaustion, and there was clearly no time to loose. Two modes of operative relief presented themselves for consideration. Should we try to pierce the cicatricial mass at the brim of the pelvis, seek for the canal of the bowel, and attempt to establish a permanent opening in it? or should we open the colon in the left loin? It would, we believed, be difficult to reach the bowel, difficult to open it, and difficult to keep the opening permanent. But there was something graver than difficulty before us; there was real danger— the danger of opening the peritoneal cavity behind the uterus. Taking into consideration all the bearings of the case, we believed that they were all in favour of colotomy. I at once performed the operation. Improvement was quickly seen, and restoration to perfect health followed.

Touching the operation of colotomy, I have a word to say. Not long ago there was a discussion conducted by very able surgeons on this point: should the parts be divided in such a manner as to leave a conical wound, the bowel being at the bottom—a wound, it was said, more favourable for recovery; or should the muscles be divided to the full extent of the superficial incision—a step which, it was said, would facilitate the finding of the bowel. Gentlemen, in this, as in so many other controversies, there seems to be a middle way. Sometimes the muscles are so thin and the wound so shallow, that little deep dissection is needed; sometimes, on the other hand, the muscles are so massive and the wound so deep, that free division of muscular fibre is, in my opinion at least, necessary. I have

opened the left colon frequently, and will tell you one item of my experience. In thin and emaciated persons, I have found the bowel within one inch of the surface; but, on the other hand, in stout persons, I have found the bowel at a depth of four inches. I shall not forget the case of a very stout man. When the tips of my fingers touched the blue colon, the ends of my metacarpal bones were below the level of the skin. [Nearly six years have passed away since the above lecture was given. The woman remains in excellent health, and the opening in the bowel is easily managed.]

Gummy Masses around the Rectum simulating Cancer.

Such masses have come under my notice in a few cases, and in some of them the diagnosis was not at all an easy task. Curiously the cases in which this difficulty occurs have been in my experience almost altogether in women. A given woman in the earlier half of adult age finds difficulty in expelling fæces from the lower bowel. Probably when she first makes the complaint she seems otherwise in fair health. There is no conspicuous cachexia, and for a time mild aperients keep her in order. But she soon has attacks of diarrhœa, alternating with mechanical constipation; the general health fails, she wastes and becomes very feeble. If the finger be carried into the bowel it will be found that the rectal channel is much contracted, and its walls seem to be made of round, firm masses, giving a feeling very similar to that of the nodules of malignant disease. This condition is clearly one of stricture—gummy stricture as distinguished from annular stricture and from malignant stricture. Probably these gummy masses, for such they are, in some cases soften down sooner or later (usually after a long period) into an extensive tertiary and very serious ulceration. In other cases they lead probably by more limited ulceration and subsequent cicatrisation to the simple annular stricture.

Now and then in these cases there are vast masses of gummy products in the ischio-rectal fossa, causing great

nodular or wave-like prominences externally, which to the unwitting eye look like cancer. These great nodules and waves may also exist *without* the cylindrical wall of gummy spheres in the rectum.

But the diagnosis is the matter I desire mainly to draw attention to here. In gummy rectum the history of syphilis is often obtained with difficulty or not at all. And it must always be remembered that cancer is common in syphilitic persons. Nevertheless, a history of syphilis has a certain weight. One of the most important factors in diagnosis is time. Gummy disease is a much longer process than cancerous. Several years ago, in one of the first cases in which the difficulty came before me, I found a woman of about 35, having a florid complexion, and not wasted in body, with a rectal tube made up of, or surrounded by, firm globes the size of large marbles. I expressed in her hearing my fear of cancer. So Dr. ————— (mentioning the name of a well known and able physician not now in practice,) told me *six years* ago, she remarked. The " six years " immediately roused my doubts, and on deeper investigation, I came to the conclusion that I had a case of gummy disease in a locality, and in a form, which surgical literature had not impressed upon me. Another feature in gummy disease is the uniform size of the ball-like masses. A rectal tube made up of marbles, all much of the same size, should excite suspicion. But this symptom is not a very reliable one—the globes, or masses, may coalesce into a larger and more irregular mass. There is much less tendency to bleed in gummy disease, but a little blood is seen occasionally; if it be seen mixed with mucus and without fœtid watery discharge, the inference would be in favour of the gummy view. The gummy mass, however large, does not become fixed to the sacrum or wall of pelvis; in the earlier stages of cancer, or gumma, this would be a symptom of less value. The " gliding " of the mucous membrane over the sub-mucous lumps is retained long in gummy disease, and is quickly lost in cancer.

Old and neglected syphilitic disease of the rectum is a disease scarcely less terrible in prognosis than is cancer

itself, but if it be looked for early, when trouble is com-
plained of, and the treatment of tertiary syphilis be adopted
early also, it is possible that we may do more good than
past experience would lead us to hope for. In old and
neglected gummy disease, where the symptoms are chiefly
those of obstruction, I show in another page much relief
may be obtained by wearing, for longer or shorter periods,
an elastic catheter in the rectum—the benefit being based,
probably, on the principle of continuous or vital dilatation.

The Treatment of Stricture of the Rectum by Continuous Dilatation.

I MEAN here the simple annular stricture, and also the
contraction due to gummy disease. Next to malignant
disease, simple stricture is the most formidable disease
of the rectum we are called upon to treat; and with
all our care life is frequently shortened in such cases,
sometimes by mechanical obstruction, sometimes by a pro-
found syphilitic cachexia, sometimes by both, in equal or
unequal proportions. The treatment by bougies, or conical,
or medicated bougies, or the occasional use of sponge tents
for brief periods, will often keep a patient in moderate
comfort for a long time. Radiating incisions are now and then
of service, but they, and indeed bougies and tents also, are
not free from the danger of setting up creeping cellulitis
and peritonitis. Several years ago I began to treat severe
cases by longitudinal division of the sphincter, the stricture
and the rectum between. (See Plate VIII., Fig. 4). Soon
after this Verneuil, where fistulæ opened above the stricture,
divided the parts longitudinally, but by means of the écraseur.
In all my cases, complete relief was obtained. In some the
relief has been permanent, in others there has been more or
less return of mechanical difficulty; but in no case has the
relapse been so severe as the state which existed prior to
operation.

For a long time I have contemplated a very simple method
of treatment, which involves no operation and little trouble.

Knowing how quickly in urethral strictures generally, and perhaps more markedly in tight ones, the retention of a flexible bougie, however fine or thread-like, will dilate the contraction, I concluded that a similar plan of treatment would be of service in stricture of the rectum. I have recently had a case, the record of which will show the utility of the proceeding. A poor woman came into hospital with mechanical obstruction of the lower bowel. We knew the woman well, as she had been to hospital before with similar symptoms. There was much gummy growth in the rectum, but there was also a tight, linear, thread-like stricture, through which the end of the finger could not be passed. During her first stay in the hospital, the occasional use of a sponge, for an hour at a time, gave her most relief, so much that she decided to go out without waiting for more complete relief. On entering the hospital a second time after an interval of eight months, she was worse, and we feared that colotomy would be required. I determined first to try continuous dilatation. My house surgeon passed a number twelve English gum-elastic catheter, and on the first occasion kept it in twenty-four hours. The benefit was marked. Instead of a constant diarrhœa she began to pass solid motions, not, it is true, in *large* cylinders, but so as to secure comfortable relief. She was an intelligent woman and she took the catheter into her own hands and kept herself comfortable by wearing it a few hours at a time. She did not wear it after the first few days so long as I believed to be necessary. She took the catheter out with her twelve months ago, and has not returned to make any complaint. I recently caught a glimpse of her in the street, and she seemed in fair health.

The catheter should be small—small enough to pass quite easily, and to be retained without any tightness or pain. It will, as in the urethra, probably produce for a time, a feeling of impatience and weariness, but this, habit and time remove. The length of time the instrument should be worn during the first days of the use and subsequently also, will, no doubt, vary in different cases. A little watching will decide the matter. I should say that during the night would be a convenient time to wear the instrument for some women;

other women will prefer, as did my patient, to lie in bed a few hours frequently during the day—not every day in her case, severe as it was. The instrument readily keeps in place without any fastening in the horizontal posture, but a fastening could be easily contrived, if it should seem needful. Lying in bed a few hours daily, or for a whole day now and then, has the advantage of voluntary quietness, a comfortable position, and the absence of fastenings.

The principle of continuous dilatation would probably prove of great service in simple and cicatricial stricture of the pharynx and œsophagus—such namely as follow burns and scalds, and the swallowing of caustic fluids. A comparatively fine bulbous-pointed bougie—such as is used for the treatment of urethral stricture—if kept in the stricture (of pharynx or œsophagus) for a few hours at a time, would probably preserve a larger channel for the transmission of food than could be maintained by any other proceeding. The instrument should lie *loosely* in the constricted part, it should be very soft and pliable; one end should emerge from the mouth so freely that at any moment it may be withdrawn. Swallowing soft food, or milk, might be tried while the instrument is retained.

When obstruction threatens in cancer of the rectum, I am of opinion that a fine bougie, a straw's size or smaller, retained constantly in the rectum would do more good than harm. The harm, if any, would be hæmorrhage, and experience only can say whether this would occur or not. The bougie constantly retained would act as a kind of shoe-horn to the fæces, and constantly maintain a channel. Each individual would decide whether the instrument should or should not be removed during defæcation. The principle of the treatment here put forward may be thus formulated— Keep up continuous dilatation of a strictured canal during the exercise of its function as well as at other times. The shoe-horn is constantly in place; or to alter the figure, the thin end of the wedge is always in, and always ready for an advance. It is presumed here that the stricture is one suited for dilatation. It is not necessary to say that it is highly improper to pass instruments in every possible sort of obstruction.

On Longitudinal Incision through Sphincter, Rectum, and Stricture.

THE operative surgery of the rectum is, as a rule, attended with a large amount of success. The treatment of stricture has hitherto, however, always presented unusual difficulties. In the *Lancet* for 1871, I published a description of an operation which I had performed, with completely successful results, for obstinate stricture complicated with fistula. I believe the operation is destined to prove of great benefit in severe stricture, whether fistula be present or not. I divide the sphincter, the stricture, and the rectal walls between the two by one incision, thus giving complete rest to the parts and a free egress to discharges. (See plate VIII., Fig. 4). The wound heals from the bottom, but the stricture is cured. Where there is a fistula it may, perhaps, advantageously guide the director or bistoury. Where there is no fistula I should make the incision at the side but nearer the middle line. Since the appearance of my case, with its illustrative diagram, it has been performed by other surgeons with marked success. Since I advocated the operation now described, I have learnt that Nelaton proposed or practised one somewhat similar in principle. M. Verneuil has quite recently published a description of a similar operation, but using the écraseur and making a larger wound. Still more recently M. Verneuil has advocated the advantages of longitudinal division of cancer of the rectum in preference to colotomy when obstruction sets in. Where the stricture lies, as it mostly does, near the anus, I believe the operation here advocated to be much safer than incisions into the margin of the stricture— which incisions have frequently ended in fatal peritonitis. It cannot be a matter of surprise that incisions in the rectum, near a constantly contracting and powerful muscle, should be followed by a cellular inflammation, which may readily reach the peritoneum. To arrest the action of the sphincter is of primary importance.

I do not claim for this operation entire freedom from recurrence, but if the stricture form again it is slighter

and (curiously) *lower down.* Elsewhere I have spoken at length of the method of treating stricture of the rectum by continuous dilatation—a method I should always try first and patiently; should it fail, vertical division of the rectum seems to me the next alternative. After using the knife, the occasional continuous retention of a male catheter would probably best prevent material relapse.

On Ring-like Cancer and Abscesses of the Rectum, simulating Hypertrophy of the Sphincter Ani.

Here before you is a woman with cancer of the rectum, having a peculiar shape, and bearing a peculiar relationship to the sphincter ani. Her general and local symptoms were not very clear, and her medical attendant, Professor Bassett, sent her here for me to examine and for such surgical suggestions as I might be able to give. You see that her general appearance, complexion, stoutness, and strength, are those of good health; but she complains of some difficulty and pain in defæcation. When the finger is put into the rectum, the first impression is that there is little the matter. The anal opening, where it is surrounded by the sphincter, seems prolonged into a tube, as it were, and the finger has to pass to a greater distance to reach the expanded part of the bowel. The swelling is uniform, not strikingly hard, not nodular, not yet fixed, and the mucous membrane is not firmly glued to the subjacent structure. But a further search brings into view other symptoms. There is pain at other times than during defæcation. Occasionally a little blood and some ill-smelling fluid come from the rectum. But there is another and a very conclusive symptom, which would be hidden from us if our patient were a male. A finger in the vagina discovers that the lower end of the rectum is lost in a firm and rather large globular mass. We find, further, that the rosiness, stoutness, and strength, although marked to us who are strangers, are said by her friends to be notably less than they were. I know no more painful duty of a surgeon's calling than to have to

say to such a patient's friends that what remains of rosiness, stoutness, and strength must come to but one end.

Unless much care be taken in the examination of a rectal cancer of the conformation I have described to you, or if it occur in the male, a mistake may readily be made, especially in the earlier stages of its existence.

Recently I saw, with his medical attendant, a gentleman about fifty-five, with the following history and symptoms. Nine months before I saw him, he noticed that a little blood escaped from the bowel—not always with defæcation, and that his linen was soiled with an ill-smelling, reddish, watery fluid. Six months later, defæcation was attended with difficulty. Occasionally there was some loss of control over the sphincter. There was some loss of flesh and strength, but cachexia was not marked. The patient walked out, and the appetite and sleep were fair. On introducing the finger into the rectum, an uniform ring-like mass was felt, beyond which the finger discovered the expanded rectum. There were no nodules and no irregularity, and the hardness was not extreme. There was, however, one symptom, in addition to the encircling mass, which was very significant— the anus was somewhat fixed.

Now before this fixity, which was probably of recent date, the physical characters of the rectal lesion were quite consistent with the presence of a greatly enlarged sphincter, or a ring of inflammatory products. I once saw (with his medical attendant, a hospital surgeon and an able writer) a gentleman who suffered from severe paroxysms of rectal pain, from whose anus reddish and ill-smelling fluids escaped, whose general health was affected, and whose rectum at its lower part was surrounded by a ring-like mass, which was found to be a ring-like abscess. The ring began as a smooth nodule, probably of gummatous origin, which extended around the rectum above the sphincter, and appeared as in ring-like cancer, to be part of it.

In this lecture, I have dwelt on a question of diagnosis only. The cases I have cited, with others that I have seen, seemed to me to have in them a lesson, which

I, you, and others, might profitably learn. The lesson is this : Do not in any case hastily say there is a cancer, but do not too hastily say there is no cancer of the rectum, merely because the finger within its cavity detects no great alteration in its shape. The caution I urge upon you is more especially needed in the case of men; in women, the rectum is almost as much before you as if it were on the table.

On Excision of Cancer of the Anus and Rectum, and on the Accessibility of the Female Rectum for operative purposes.

There are certain distinctions which should always be drawn in cancerous diseases of the lower end of the gut. One of these is commonly made. There is another which is not commonly, or at any rate, not specifically made. I will shortly put before you a few facts which will enable you to judge for yourselves whether it should be made or not.

The distinction which as a rule is *not* lost sight of is, that the rectum proper is the seat of various kinds of malignant disease, while it is rare for other than epithelial cancer to begin at the anal opening. Scirrhus starting in the rectum may, it is true, quickly reach the anus, and epithelioma of the anus may as readily crawl up the rectum. Why it is well to draw a line between the tube and its outlet is seen in many ways. The anus is very accessible; no canal, or cavity, or big vessel, or big nerve lies very near to it, Above all, the cancer which seizes upon it is of all cancers the most local in its origin, the mildest in its course, the least likely to return after removal. Bear in mind that I am speaking now of epithelial cancers generally. I do not say that epithelioma of the anus is less grave than epithelioma elsewhere. On this point I have little to say, save that site goes a long way in determining the career of a cancer. I once saw an epithelioma seated over the sternum which had grown for thirty years, and seemed likely to grow another thirty; on the other hand, I have seen an epithelioma of the tongue run as rapid a race as an encephaloid cancer.

Position is but one of many influences which guide the clinical course of a malignant growth.

The other distinction which, I believe, is not commonly made is, that the female rectum, from a surgical point of view, is a totally different organ from the male rectum. It is different in size, and, what is more significant to us, it is very different in its relations and accessibility. A woman's rectum, with its ailments and its contents, can be reached at almost every aspect. I do not mean, merely, that a small hand can be introduced into it when it is healthy and in certain diseases, but that it can readily be got at from the outside in health and disease; in short, the female rectum having in front of it so capacious a canal as the vagina, is practically almost as superficial an organ as if it were actually under the skin, like the mammary gland.

The surgical bearing of the distinction I put before you is this, that objections to the excision of the rectum should not be of equal force in the two sexes. They should have much influence in males and scarcely any in females. On the continent, cases have been recorded of the bold excision of the rectum proper, and even of adjacent parts (suggesting, indeed, the idea of a general scooping out of the pelvis), regardless of sex. In this country there is a strong disinclination to excision of the rectum; a disinclination with which I have much sympathy, and should have more, if it were not also an objection which pays no regard to sex. No records of alleged success would induce me to remove a cancerous male rectum, with portions of the urethra and prostate gland, allowing, if the patient survive for a time, fæces and urine to drop into one common chasm, only to drop out of it again. But are we quite right in refusing to remove an isolable cancer of the lower part of the female rectum (even though it began in the rectum) when it is distinctly below the peritoneal level, when the back wall of the vagina may be safely removed with it if it be needful, and when, above all, the urinary pathway may be left untouched? In a previous lecture on destruction of the rectum, you saw how a woman may live in moderate comfort without that organ.

The case before you, was one of epithelial cancer, beginning at the anus, it is true, but involving the rectum for some distance. Through the vagina there could be felt a globular hard mass at the lower end of the rectum; the vaginal wall itself was free. There was loss of blood, with severe pain, and very difficult defæcation; some kind of operative relief was earnestly besought. I decided to remove the parts very freely, in obedience to the principles I have just placed before you. It was not necessary in this case to invade the vaginal canal, but I removed a mass, which, with the healthy tissue around it, extended from the vulva to the coccyx, and from one ischial tuberosity to the other. Three inches of bowel were taken away; a full-sized cricket ball could have been put into the cavity. The shock which followed was not severe, and the subsequent recovery, as you see, has been good. A singular and unlooked for feature in her recovery was the facility with which she acquired sphincteric power in the cut extremity of the bowel. The ordinary circular fibres of the gut proved themselves able to obey the will and hold back the fæces.

Excision of the Outlets of the Pelvic Organs.

This is a branch of surgery in which I have had the opportunity of gaining much experience. In a case of epithelioma of the vulva I excised both labia, the clitoris, and two-thirds of the urethra, with a recovery of several years to my personal knowledge—the patient eventually passing from under my notice. The urine was completely under control. Our guiding principle should be : only to excise those cancers the extent and area of which we can clearly ascertain, and then to excise these very freely.

A Simple Plug for Rectal Hæmorrhage.

Two years ago, under somewhat urgent circumstances, I devised a plug for the rectum, which I have found ready, simple, and efficient in checking hæmorrhage from the rectum, whether recurrent or secondary. The tip of the fore-finger thrusts the centre of a thin white pocket hand-

kerchief well into the rectum, large marbles of compressed cotton wool (or rag) are then gently pushed into the pouch in the rectum until it is amply distended, and of a balloon shape. (See Plate VII., Fig. 7.) Expulsive efforts, or moderate traction on the handkerchief, increase its hæmostatic efficiency. The wool marbles may be moistened with the perchloride of iron if it be deemed necessary. A plug saves the necessity of pulling down the rectal wall with a vulsellum forceps and tying the bleeding point—not a pleasant alternative, especially without chloroform. In twenty-four or forty-eight hours the rectum converts the balloon into a cylinder which is readily withdrawn at pleasure.

Mr. Allingham describes a method of using sponge pressure for the arrest of rectal bleeding which is well worth attention. The surface of a sponge is singularly effective, as I elsewhere endeavour to show. Should an opportunity arise, I purpose modifying the method I have used by pushing a piece of net (from a ladies or servant's cap or handkerchief) into the rectum, and then distending it with small pieces of sponge. I have long used washed and soft net as a covering to pads of carbolised tow. I do not see why it might not so cover sponge fragments as to make them more convenient and shapely as surgical dressings. Since I described the above plug in the first edition of this work, I find that Billroth uses one entirely similar in principle. I do not on this account withdraw the proposal. A proceeding which two surgeons have adopted, independently of each other, is the more likely to have some value.

Exostosis of the Sacrum.

I was asked to see a lady in the country with some mechanical difficulty in defæcation. The difficulty amounted almost to obstruction on some occasions, but could be relieved by the repeated use of aperients. The appetite was indifferent, but there was no sickness. The temperature and pulse showed the absence of fever. The abdomen was not tender or tympanitic. The mechanical difficulty at the lower bowel, the indifferent appetite, and a feeling of being out

of sorts, were the only symptoms. The finger on being introduced into the rectum immediately came upon a remarkable and fixed obstruction. This proved to be a hard, long, finger-like, and tapering mass about two inches in length, which was fixed by its broad end to the centre of the cavity of the sacrum. The pointed end pushed before it the rectum and, as might be expected, the posterior wall especially. There could be little doubt that it was bony and perhaps rather of the nature of an osteophyte than an exostosis. It appeared by pushing forward the posterior wall of the rectum to divide the rectum into a complete double tube : the left tube being the larger of the two. I venture to put forward this ground of hope— that time, mild aperients, and, above all, time, would gradually accustom the rectum to the mechanical obstruction, and especially by more and more enlarging the channel on the left side of the rectal cavity. I saw the case about four years ago, and her medical attendant tells me she is now in fair health, and has little or no trouble with the bowel. If the symptoms of obstruction had increased, or proved persistently troublesome, Amussat's operation was kept in view as a measure of reserve.

PART IV.

ENQUIRIES IN THE SURGERY OF THE PELVIS.

ABSTRACTS OF CLINICAL LECTURES ON DISEASES OF THE TESTIS.

On the Extension of Inflammation from the Epididymis to the Urethra.

I HAVE had many opportunities of showing you cases of epididymitis following urethral disease. The disease is a common one, and its causes are many—almost too many to count. It would be easy to run over some half a hundred, and yet leave a few unmentioned. Urethral disease following and resulting from inflammation of the epididymis is, on the other hand, rare; it has few causes, and is not yet at all recognised.

I show you here a case of urethral discharge, which followed traumatic inflammation of the epididymis. This young man was in good general and genital health. He had never had gonorrhœa. His urethra, meatus, and prepuce were perfectly healthy when he came into the hospital. He received a violent kick on the left testis, and came in two days afterwards with some ecchymosis in the scrotum, and severe pain, tenderness, and swelling, which were clearly seated in the epididymis. On admission, the cord was not thick, nor tender, nor painful. The day after admission, I myself found part of the cord greatly thickened—the thickened portion running up from the testis, and gradually subsiding just below the outer inguinal ring. The second day after admission, the swelling of the cord had passed into the canal, which was now full and tender. Two days later a urethral discharge, neither abundant nor scanty, and

whiter than ordinary gonorrhœal fluid, made its appearance, and with it micturition became a little painful and a little more frequent. This is the first case I have been able to show you, and I have myself seen very few.

Recently I saw a case of epididymitis, also from injury, of much interest, and having a direct bearing on our subject. A gentleman, aged fifty, in fair health, came, in the dark, with his right testicle against a key in a door. Scrotal ecchymosis and considerable epididymitis followed. The cord became much enlarged, running like a rope up into the inguinal canal. Later, an abscess formed and broke at the front of the scrotum. Now in this case, from first to last there was no urethral discharge. There was undoubtedly inflammation of the epididymis, and as undoubtedly the inflammation ran up the cord—probably to the urethra.

The question naturally suggests itself, albeit parenthetically, Why does inflammation of the mucous surface yield a muco-purulent discharge in one case and not in another? Why, in one case of inflammation of the bladder or bronchial tubes, is there abundant pus and mucus, and in another case little or none? I reply, We do not know. You frequently hear me use the expression "We do not know." I think it better to say plainly we do not know than to cover our ignorance with sounding phrases. It may seem paradoxical to you, perhaps, but I often silently contemplate the benefits of a negative system of surgery—if we could get it: I mean a systematic review of what we do *not* know. The author would be a man of no ordinary courage; he ought to be a man of learning, experience, and judgment equal to his courage.

The case I have just told you proves the conclusion I wish to bring before you—namely, that inflammation may run upwards from the epididymis—more forcibly, in one respect, than if a discharge had followed. You are aware that at the height of a consecutive epididymitis the urethral discharge often disappears, only to return a little later; but here it was clear we had no hypocrite trying to hide a clap, because there was at no time any clap to hide.

Touching the question of suppuration, I find, with surprise, that so careful an observer as Van Buren denies its occurrence in epididymitis. If there be an abscess, he infers that the body of the testis is inflamed. I believe that in this country surgeons are agreed that suppuration is not rare in the consecutive or other epididymitis of cachectic men.

Let me ask you now to look for a few moments at the causes of inflammation of the epididymis and cord. Bear in mind that any inflammation of the prostatic urethra may extend along the cord to the epididymis. Now, an inflammation of the bladder of any kind, whatever its cause, under whatever circumstances it arises, may run forwards to the prostatic urethra, and thence to the epididymis. Again, an inflammation of the anterior urethra of any kind, however caused, arising under whatever circumstances, may run backwards to the prostatic urethra, and thence to the epididymis. Acute inflammation arising primarily in the epididymis has few causes : I can speak positively of one only,—injury. If the causes of primary epididymitis were more numerous, we should, I think, long ago have held urethral disease to be one of its results. Why injury sets up epididymitis mostly, and not orchitis, is no doubt for the same reason that inflammation of the cord and epididymis so rarely reaches the testis—namely, that within the tunica albuginea there is no room for acute inflammation, for vascular changes, cell-proliferation, migration of cells, the running riot of germinal matter, or other inflammatory phenomena. Since the above was in the printers' hands I have seen a case in which the following events clearly occurred :—Strumous orchitis, thickening of cord extending gradually up to the inguinal ring, and, lastly, urethral discharge.

If you accept the facts of the case before you, and my reading of them, you will now and then be able to explain an otherwise obscure gleet. Moreover, you will not be compelled to affirm that in every case an epididymitis and a gleet together have necessarily a urethral, much less a

sexual, origin. The views now before you may occasionally have (I speak from personal observation) important domestic or legal bearings.

The treatment I adopt here is that which I am in the habit of adopting in inflammations; but which, seeing that it is exceptional, and strange to examining boards, I rarely take up your time in explaining. My creed is brief: I believe that the inflammatory process is much the same everywhere. I believe that the best remedies in one inflammation are the best in all. I believe that the best remedies are removal of cause (where it is removable), rest, adjacent and not too near counter-irritation, suitable pressure, elevation, and a few simpler matters. I therefore in each case try to find out the best way of using these remedies. In acute epididymitis I enjoin counter-irritation lightly over the scrotum, sharply in the groin and front of thigh; pressure, which begins as a delicate support, and goes on to actual compression; rest and elevation, as far as they are practicable. The value of compression is well seen in the circumstance to which I drew your attention a moment ago—namely, the pressure kept up on the testis. If our bodies were mapped out into small areas, and each area were bounded by a firm capsule like the tunica albuginea, we should be free from the dangers of at least acute inflammation.

On Congenital Encysted Hydrocele of the Cord.

Many varieties of collections of fluid or hydroceles may be met with in the scrotum. There are the vaginal and inguinal hydroceles, hydroceles of the testis, hydroceles of the cord, and hydroceles of the hernial sac. Two or more of these may be found together. One or more may be combined with some kind of scrotal hernia. More rarely other combinations are seen.

I do not propose to consider the subject of hydroceles generally, their origin, or anatomy, or diagnosis, or treatment. I shall limit my remarks to hydroceles of the cord.

These are commonly due to an imperfect obliteration of the peritoneal prolongation, which usually takes place along the cord from the internal inguinal ring to a point a little

above the testis. Curiously enough the "diffused hydrocele of the cord" of remoter days has not been seen by any living surgeon, and "independent cysts" in the neighbourhood of the cord are extremely rare.

Although the process of obliteration of the peritoneal extension usually becomes complete it begins at two points— one at the ring and another near the testis. It follows naturally that if there be any incompleteness of effacement it will be between these two points. In the unobliterated space fluid may collect, having the characters of that which is found in simple vaginal hydrocele. The accumulation of fluid forms a spherical, tense, and circumscribed enlargement, which is very movable, and readily separated from the testis. The cord as a rule may be felt above, and runs with its vessels behind, the swelling. Transparency is present, but the enlargement cannot always be made so prominent as to give clearness to this important symptom. In seeking for transparency I have repeatedly, especially in the very young, found great assistance from the lithotomy position—the head of the child being turned towards the light. Pain and tenderness are usually, but not always absent. The disease is more frequent in, but not confined to early life. This collection of fluid is called "encysted hydrocele of the cord," probably to distinguish it from the so-called "diffused" variety, but if the diffused variety should be proved to have no existence, the simpler name of "hydrocele of the cord" may perhaps come into use. I have met with two peculiar varieties of hydrocele of the cord, of which I believe surgical literature gives no account. The peculiarity of the first variety is this: a so-called encysted hydrocele of the cord is connected with the abdominal cavity by means of a long fine tube. The peculiarity of the second variety is in the existence of an encysted hydrocele of the cord having a fine tubular prolongation upwards, which ceases near the external ring; the tube is there, but it does not communicate with the abdomen.

Mr. L., aged 23, was sent to me from Northamptonshire,

with an enlargement in the right scrotum of twelve years' duration, about which various opinions had been given. The swelling was the size of a walnut, and was situated midway between the inguinal ring and the testis. It was globular, moderately tense, circumscribed, and well defined above and below. Clear spaces intervened between it and the ring above and the testis below. The cord was readily felt above, but seemed thickened to the size of a straw. The swelling unquestionably transmitted light. There was some impulse on coughing, and the swelling became a little larger, but remained wholly transparent. During the act of coughing, there was a sensation to the finger and thumb of fluid passing downwards through a fine tube connected with the seemingly thickened cord. The rustling sensation was precisely similar to that given to the finger by the india-rubber tube of a feeding bottle when a baby is taking its meal. The swelling was a little larger during the day. It could also be lessened by pressure, and by continued pressure it could be made to slowly disappear. During pressure the sensation of fluid passing upwards through a tube was very striking. On the removal of pressure the globe slowly refilled. There was no hernial protrusion on coughing. There was no history of any such protrusion. There was no tenderness. There were, however, occasional attacks of pain which led to his seeking surgical aid. A light truss was applied. When seen twelve months later it was found that the truss had entirely relieved the pain, but there was only slight diminution in size. There are several points of interest in the above case which may be briefly touched upon. I believed it to be a case of so-called encysted hydrocele of the cord, communicating with the abdominal cavity by means of a fine tube of unobliterated serous membrane. If it be objected that cysts are closed cavities, I reply that they are not always so. The contents in some cases may ooze or be squeezed out of a mammary cyst, a ranula, a sebaceous cyst, yet the name "cyst" is in all these cases properly retained. Nevertheless, herein is another reason why the expression "hydrocele of the cord" is perhaps

preferable to the ordinary one of "encysted" hydrocele of the cord.

That the case was really one of hydrocele of the cord seems clear. It certainly was not a vaginal hydrocele. It was not a hydrocele of the testis. It was not a hydrocele, true or spurious, of the hernial sac. Neither bowel nor omentum could have passed through so long and so fine a tube—a tube not larger than a straw.

Water Bottle Hydrocele of the Cord.

The peculiarity of the second variety, as already stated, is the existence of a tubular prolongation running upwards, but ending in a blind extremity outside the inguinal ring.

Abraham W., aged 18, came to me at the hospital with a circumscribed, globular, transparent enlargement, rather larger than a marble, of two years' duration, and seated in the right side of the scrotum. Its movements were free and independent of the testis and the inguinal ring. Above the swelling the cord seemed thickened for about an inch and a quarter. On pressing, however, on the swelling, it became apparent that fluid passed from the swelling into a tubular prolongation—distending but not passing through it. On pressing the tubular prolongation the globe below became a little more tense. There was, in this case, slight but defined bulging at the ring on coughing; but the impulse did not reach the swelling and the cord was not concealed. As there was no communication with the peritoneum or doubtful proximity to it, acupuncture was resorted to and proved successful after two or three repetitions.

I have seen another case, in a boy, precisely similar to the one which has just been described. A globular collection of fluid which has an upward neck-like prolongation so much resembles a miniature water-bottle that I venture to suggest for it the name of "water-bottle hydrocele of the cord." (See Plate VIII., Figs. 5 and 6).

[When I brought these cases before the Medico-Chirurgical Society, several speakers, confounding them with the well-known condition of imperfect obliteration of the peri-

toneal process (from abdomen to testis) saw little that was new in them. It is a sufficient reply to say that Mr. Curling, in the latest edition of his work, and in conversation with me, entirely accepts my views, and accepts my designation as the title of a new chapter in the last edition of his volume on diseases of the testis. Mr. Curling records my first case in full, and tells me he himself has never seen one. The case would, therefore, seem to be the first that has been described in this country].

The Radical Cure of Encysted Hydroceles, and also The Treatment of Certain Cysts.

A More Effectual Method of Applying Iodine to the Interior of Encysted Hydroceles and Certain Cysts.—I have found that there are in practice two classes of scrotal hydroceles, in which the ordinary methods of treatment are either difficult to use or uncertain in their result. In boys and men there are occasionally encysted hydroceles of the testis, or the cord, which continue to increase in size, or in which treatment is urgently requested. In such cases, except in early infancy, acupuncture, or the use of a fine trocar, often fails to cure. The walls of the cysts are usually thin, and collapse so much when their contents are withdrawn that the injection of a fluid is uncertain. The end of the canula may be outside the cyst, and the iodine solution be consequently injected into the connective tissue at its exterior. In such cases the following is a reliable method of treatment :—The cyst being well isolated, made tense, and brought near the surface, I pass through its centre a stout needle, armed with silk, and leave the threads hanging. The fluid quickly oozes away, especially if a little traction be made on the threads. I then, at one opening, wet the threads with iodine liniment (liniment because the quantity required is so limited) and draw the threads so as to leave moistened portions within the cyst. A little gentle friction will help to spread the iodine thoroughly over the lining membrane of the cavity. An hour later freshly moistened portions may

again be drawn through if the cyst be large, or if other methods of treatment have failed. On the other hand, in a very small cyst a single thread, moistened and kept in one hour, will suffice.

Another class of cases are those of simple vaginal hydrocele, in which the injection of iodine and other ordinary methods of treatment are unsuccessful. An interesting case will best convey what I wish to say. A young man had a moderate sized hydrocele. Trocar puncture, and acupuncture repeated a few times failed, and consequently iodine tincture (undiluted) was injected. In a few weeks the collection had reached its old size. A silver wire seton was then put in; while in, the cyst remained empty, but its removal was followed by reappearance of the fluid. I then, at three o'clock, passed through the cavity a double silk thread at two spots. In a few minutes, when all the fluid had oozed out, I drew the threads, moistened with iodine liniment, into the serous cavity. I directed him to repeat the process in an hour. He was so anxious to get well—he was shortly to be married—that he moistened the threads four times in six hours. At midnight the effects had become so sharp that he was glad to remove the threads as he had been directed. He remained at home one day only, and was shortly well.

I venture to believe that no kind of hydrocele will resist this method of applying iodine, and consequently that the setting up of suppuration, even as a last resort, can rarely be necessary. In certain thin walled cysts, for cysts which cannot be removed, this method of treatment may perhaps be used with advantage.

OBSERVATIONS ON THE SURGERY OF THE PENIS AND URETHRA.

The Treatment of Congenital Deficiency of the Corpus Spongiosum with Curvature of the Penis and Hypospadias.

Cases of imperfect development of the spongy body of the penis, in which there is more or less hypospadias, curvature

of the penis, and attachment of the scrotum to the frænum, are not very rare. When the curvature is markedly present during erection, sexual union is impossible. A case of a severe character was brought to me where marriage had been a rite only, not a fact—where many surgeons had been consulted and many kinds of advice had been given and taken, but in vain. I regarded the " dissecting operation " as complicated in method and unsatisfactory in results, and as necessarily increasing the hypospadias, and thus lessening the chances of fertile marriage. Having explained to the patient, without giving too hopeful a view of the result, the nature of the operation I am about too describe, he readily gave his consent. I cut a large wedge-shaped slice out of the centre of the dorsum of the penis, and freely removed portions of the cavernous bodies. (See Plate IX., Fig. 1.) I assumed, and justly, as the event proved, that the portions of the cavernous bodies left below the excision would suffice to preserve the power of erection. I put in a few deep stitches, and directed the penis to be kept against the wall of the abdomen—a now possible and easily maintained position. The bleeding at the time, and some recurrent bleeding, were not more than is to be expected in severe wounds of the penis. The stitches cut their way out before union was obtained, but strapping and position were followed by an excellent result. The man's surprise at the new position of his penis was even greater than his delight. He left the hospital, saying, to those interested in his case, that his penis during erection "turned upwards instead of downwards." In young children the free removal of the redundant prepuce on the dorsum of the penis, in such a manner that the scar may shorten the upper surface of the penis, and lengthen the under surface, is a useful proceeding.

An Operation for Congenital Phymosis.

I HAVE more than once brought before the notice of medical readers—on the first occasion, upwards of twenty years ago, in the *Medical Times and Gazette*—a simple operation for congenital phymosis, which I have performed for many years.

It is best adapted for young men from puberty upwards. For little boys, as a rule, circumcision is best. After childhood the operation about to be described has the merit of completely relieving the phymosis, and yet of not interfering with work, or movement, or occupation. It is, perhaps, the only operation, which, while wholly effecting its object, does not require the patient to lie in bed. The prepuce first on one side and then the other, is divided, skin and lining, by probe-pointed scissors to the extent of a quarter of an inch. The prepuce is then partially retracted, exposing on both sides a quadrilateral space of lining membrance, which is divided by a second snip on each side. The prepuce may then be fully retracted, and the incisions which were made parallel with the long axis of the penis will be found to have assumed a linear shape at right angles to the line in which they were made. The incision may be more or less free according to the degree of the phymosis. Usually no stitches are needed, all that is required is that the prepuce be kept well retracted by a strip of greased or wet lint. (See Plate IX., Figs. 2, 3, and 4.) It is no slight testimony to the merits of the operation that Mr. Lister (see a recent Clinical Lecture reported in the *Lancet*) has performed it in preference to other operations during the last fifteen years.

ON THE RESULTS OF CONGENITALLY SMALL URINARY MEATUS IN MALES AND FEMALES.

THESE results I briefly pointed out ten years ago. (*Brit. Med. Journ.* 1870, Vol. II., p. 591). Further experience teaches me that the congenital defect in question is a frequent cause of otherwise obscure urinary ailments. The natural meatus in the male extends from the centre of the glans to near the frænum. An opening in the centre of the glans a line or two in length, looking as if it would scarcely admit a pin's head, is practically a stricture and may give rise to almost all the results of stricture. I not infrequently meet with the cause and the effects. In boys a common result is cystitis simulating stone in the bladder. Boys, however, often escape notable trouble; as men they are

not let off so easily. With the cares, indigestion, gout
(disguised or open), and other ailments which increase the
acidity of urine, there come one or several of the results
of stricture. In fact there is not one of the sequelæ of
stricture, with the exception perhaps of extravasation of
urine, which I have not known to follow the presence of
an unusually small urinary meatus. One such effect is
urethritis, which, by continuous extension, may lead to
prostatitis, or cystitis, or epididymitis. There are some
surgeons who, under these circumstances, would affirm that
the urethral inflammation had been caused by the contact
of some noxious fluid. I will not here discuss the merits,
or demerits, of a policy of uniform incredulity. My answer is
this : Often in cases of diminutive meatus the bladder is
affected first, then the prostatic urethra, then, perhaps, the
inflammation may extend along the vas deferens, setting up
consecutive orchitis, and from first to last there is no urethral
discharge. I remember that in one week there came under
my notice, by curious coincidence, four cases of epididymitis
having no other cause than small meatus, and resisting all
treatment except the enlargement of that aperture.

Very frequently the symptoms are confined to the bladder.
Frequency of micturition, supra-pubic pain, mucus or blood in
the urine are, singly or combined, the subject of complaint,
It is remarkable how single symptoms of cystitis may exist.
especially when due to the milder causation of a small meatus.
A clergyman was sent to me with a very obstinate ailment,
but it consisted of one symptom only, supra-pubic pain. A
young man during a period of ill-health, marked by great
acidity of urine, had one bladder symptom only, hæmaturia.
Both men had a small meatus. In one man who had slight
attacks of hæmaturia, the symptoms were mostly confined to the
spring of the year. The easterly winds and cold producing
in all probability very acid urine. The acid urine with a
large urethra would matter little, and a narrowed urethra or
meatus with normal urine would probably give no trouble.

A diminutive urethral orifice aggravates and prolongs a
gonorrhœa, or gleet, or stricture, and their ordinary sequelæ.

The treatment I adopt for small meatus and its resulting ailments is an incision downwards towards the frænum made with a concealed bistoury. The result has been in all cases— a large number—successful. The success is not always rapid, especially in old standing cases of cystitis, but sooner or later relief follows.

It is natural that the shorter and simpler urethra of females should be less frequently associated with vesical distress. Now and then, however, but very much less frequently than in males, both in young girls and women, we meet with cystitis of a seemingly inexplicable character. In such cases I have found a markedly small meatus. Whether the urethra itself has been smaller or not I have not been able to decide, but I strongly suspect that the mischief lies mainly at the orifice. In dilating the urethra with the finger there is a feeling at the meatus as though a thin thread were tightly tied round even a small finger. It would seem that when the urinary outlet falls below a certain (perhaps a relative) size, bladder trouble begins. A small meatus in women, as in men, may give rise to few or no symptoms if the general and uterine health be good. But in women as in men, a constricted urinary outlet is, though rarely, the last feather which breaks the camel's back. Hysteria is probably present in some of these cases, but it is not likely to affect little girls, and it does not explain all the bearings of the cases of adults. Hysteria is often a lofty and ostentatious fabric, but underneath it there is a real, though a slight, pathological or physiological foundation. I have met with the cystitis now spoken of oftener, but not invariably, in young girls and in adults than in young women. The greater acidity of urine in children, and the greater "worry" of women, may perhaps explain this.

The symptom which in females overtops all others is frequency of micturition; other symptoms may be slight or absent. In obscure cystitis in women it has occurred to several surgeons (especially to Mr. Teale of Leeds) to dilate the urethra with the finger or a dilator. For several years I have adopted this treatment with fair success. In some cases

it fails or succeeds only for a time. In future, I intend in these cases to incise with moderate freedom the meatus, and, if need be, the adjacent portion of the urethra. I purpose making the incision upwards with a concealed bistoury, the blade being projected after the bistoury is introduced to a fixed and definite degree, and drawing the blade along the whole urethra. The urethra will be divided only where it is contracted, if indeed it be contracted at all.

An Operation Through the Rectum for the Treatment of Impassable Stricture and Retention of Urine.

It is not often that we meet with a case of retention which we cannot relieve by other than operative means. Now and then, however, all our efforts fail. I do not wish to under estimate the value of the means at our disposal, but I have always felt, and indeed seen, that puncture of the rectum did not, at any rate actively, treat the stricture, and that perineal operations were difficult and disappointing, although I willingly admit that of late the method and the instruments for carrying it out have been much improved, especially by Mr. Wheelhouse, of Leeds. I have often thought how much easier it would be, in the use of urethral instruments (as in many other affairs in this life) if we could go with the stream instead of against it. I thought if we could get behind the stricture, and pass soft bougies from behind forwards, we should, as it were, follow the difficulties and not meet them. My first idea was to make a small incision into the bladder close to the base of the prostate gland, and pass a bulbous-pointed bougie from the vesical meatus onwards to the external meatus. Now and then, when the distended bladder is very much depressed in the pelvis, I still think this may be the more practicable method. In the dead subject, however (and so far in the living), I have found it easier, and when easier it is certainly safer, to enter the membraneous part of the urethra. The steps of the operation are these : A well curved bistoury, covered with adhesive plaster except three quarters of an inch at the point, very sharp, and, it may be, double

edged near the point, is carried by the index finger into
the rectum; the finger directed forwards passes into a
depression between the anal sphincter and the prostate:
this depression corresponds with the membranous (dilated as
a rule, in such cases) urethra. The bistoury is then thrust
forwards at right angles to the axis of the rectum, exactly in
the median line, and about an inch and a quarter from
the anus, and in front of the apex of the prostate, which the
finger can readily feel. The bistoury is then *drawn forwards* to an
extent sufficient to allow the tip of the finger to be introduced
into the urethra. This step of the operation requires to be
boldly done. The finger can now be carried backwards
to the bladder or forwards to the stricture. The finger being
directed towards the stricture a soft French bougie is
directed forwards along its concavity, through the stricture,
and out at the meatus. The rectal end of the instrument is
then carried into the bladder, and the stricture is treated on
the principle of continuous dilatation. In twenty-four hours a
larger instrument can be introduced from before backwards,
and in another twenty-four hours one of the largest size. I
have performed the operation four times, and in every case
the rectal wound healed quickly and completely. Mr. Stromeyer
Little of Shanghai, and the late Mr. Maunder, both performed
the operation. In Mr. Maunder's case the method was effected
with great ease (see Addendum to Notes on Vesical
Calculus). The operation I have just described relieves the
retention and cures the stricture at the same time, and I
am unable to see that it can be followed by any untoward
consequences. With a large finger it may not be the
easiest of operations, but in the subject I have always cut
readily into the membranous urethra. (See Plate IX.,
Figs. 5, 6, and 7).

Since the above was in type I have had a remarkable
case bearing on the utility of this operation. A middle
aged man was sent into hospital with an extremely tight
stricture. With no kind of instrument and no amount of
perseverance could the stricture be traversed. The bladder
began to rise more and more above the pubes. I performed

the operation I have just described without any difficulty. A soft instrument was readily passed into the bladder, and the retention relieved, but no instrument could be passed forward through the stricture. I therefore, keeping the tip of my left index finger in the membranous urethra, cut down upon it through the perinæum. The soft catheter was now carried through the perinæum into the bladder so that there might be no influence tending to favour the formation of a recto-urethral fistula. The rectal wound healed at once; but rest kept up for a fortnight did not enable us to pass any instrument through the stricture. The next step was to perform perineal section. This was a simple measure, seeing that the tip of the finger could be placed at the back of the stricture, and an instrument carried to its front, but the finest probe could not be passed through the stricture until the fibrous tissue around it was almost wholly cut through. A soft catheter, kept in the whole length of the urethra for two days, completed the operation. Later a No. 14 (metal) was frequently introduced, and the patient was soon well. A severe cystitis, with which he entered, subsided after the relief of the retention.

The Retention of Bougies instead of Catheters for the Continuous Dilatation of Strictures.

Among the various methods of treating stricture of the urethra, that of continuous dilatation is justly held in much esteem. In a few days, and with no risk, a very tight stricture may be dilated so as to permit a large instrument to be passed; hence the treatment may be said to combine the safety of gradual dilatation with the rapidity of incision. It is not suited to every case. It will not, for example, take the place of internal division in strictures anterior to the scrotum, nor of division in extremely irritable or resilient strictures and strictures with persistent fistulæ. Nevertheless, in a large number of tight—perhaps very tight— old and neglected strictures, with no great irritability or

PLATE IX.

Fig. 1 shows a method of operating for congenital deficiency of the corpus spongiosum.

Figs. 2, 3, and 4, show a method of relieving congenital phymosis (after infancy is passed).

Figs. 5, 6, and 7, show a method of operating for impassable stricture through the rectum.

Fig. 8. Ancle-collar in young women.

Figs. 9 and 10 show retraction of scaphoid under malleoli after excision of os calcis and astragalus.

PLATE IX.

Fig. 1.   Fig. 2.   Fig. 3.   Fig. 4.

Fig. 5.   Fig. 8.

Fig. 6.
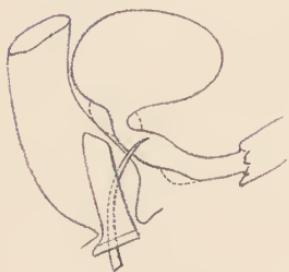
Fig. 9.
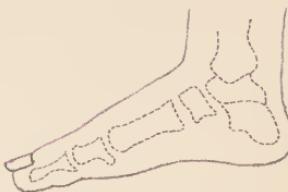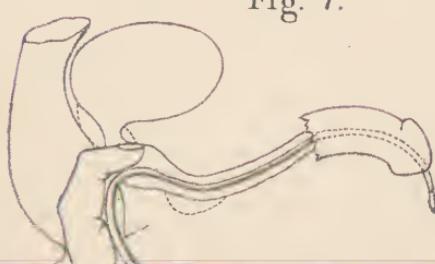
Fig. 7.   Fig. 10.

resiliency or attendant induration, the surgeon is glad to get in a fine instrument and leave it in.

Although it may require much patience and skill to introduce the finest bougie, the general custom is to withdraw it and attempt the introduction of a catheter. The effort occasionally fails, and much valuable time is lost. Now, in such cases I have for several years *kept in the fine or filiform bougie, and directed that the urine should be passed from time to time by its side or around it.* In every instance in a large number of cases this has been easily done, micturition, as a rule, actually being easier and in a larger stream than when the bougie is out. In twenty-four hours a goodly-sized bougie (not catheter) can be introduced. On the third day (but a day or two matters little), I usually put in a No. 12, or even No. 13 bougie or catheter. It is of course in the earliest stages that the superiority of the bougie over the catheter is seen.

The advantages of the treatment I have just described are these :—A more rapid and complete dilatation, due to the hydrostatic pressure of the urine along the exterior of the bougie; a bougie is more easily introduced than a catheter; when the finest bougie is once in, it need not be taken out—no slight boon; the ordinary acts of micturition are preserved; every kind of apparatus for keeping the bed dry, or for any other purpose, may be dispensed with; all the risks of operative interference are avoided.

A Method of Treating Retention of Urine from Prostatic Enlargement.

The proposal I now make is not intended for cases where catheterism by the patient himself or by his medical attendant (when that is possible) keeps up a fairly comfortable condition. It is intended for the few cases where an instrument cannot be passed at all by patient or doctor, and also for the cases where, although the doctor (only) can pass a catheter, distance and other circumstances prevent the catheter being used with the needful frequency.

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In a clinical lecture, reported in these pages, on a method of performing lithotomy, I have ventured to state the principle that the front of the bladder should be more utilised for operative purposes. Acting on that principle I make the following suggestions. Let it be supposed that a case of prostatic retention is before us. An expert and experienced hand cannot pass an instrument—not. a frequent occurrence unless an inexperienced hand has previously injured the parts—nevertheless it sometimes happens. Here I would pass down a curved grooved (lithotomy) staff well into the membranous urethra, indeed as far as it will go without force. Next I would incise the perinæum in the middle lines, so that the finger should readily come into contact with the staff. The finger remaining firmly in the membranous urethra the staff should be withdrawn. The next step is an important one. The finger being clearly in the urethra it should carefully find its way into the bladder. A sensitive, intelligent, pliable, and not very large finger will probably do this when an instrument cannot. A finger may push obstacles to one side, or downwards, or upwards. Such obstacles may be too firm to be overcome by a soft instrument; they may be too tortuous and angular to be overcome by a hard one; a sensitive and a confident finger will probably overcome both. When the finger is in the bladder, a soft catheter should be passed by its side fairly into its cavity and fastened in. When the catheter has been worn a little time it will probably be taken out and put in again with ease. It might be well to have in readiness for exceptional cases short catheters open at the ends which could be withdrawn and put in over a German silver stilet—the stilet being passed through the catheter already in the perinæum and bladder, next, the catheter being drawn out over the stilet, lastly another, or the same cleansed, may be put in over the stilet. The stilet must of course be without handles or have a movable handle only. After some days' rest in bed the patient, if going on favourably, might have a urinary receptacle fixed to the catheter in the perinæum and also attached to the thigh.

If the difficulties are such that neither catheterism nor the finger through the perinæum can overcome them, and unequivocal retention is present, I should for my part puncture the front of the bladder through the roof of the urethra. I am now presuming that the membranous urethra is open in the manner just described, and that the finger has failed to reach the bladder. The route is not longer than by the rectum, and does not interfere with defæcation. It is perhaps longer than the supra-pubic route; but it is further from the peritonæum, is more dependent and direct. The membranous urethra being open there, I should puncture the front of the bladder with a trocar—pushing the trocar upwards and backwards. When the trocar is in the bladder I should pass a small elastic catheter through it, and leaving the catheter take out the trocar. The catheter should be open at the end to permit of introduction and withdrawal on a stilet.

My own experience in the methods of treatment here suggested is not great, and time and experience only can determine their value. I have not yet punctured the front of the bladder from the perinæum. Not long ago, in a case of epithelioma of the neck of the bladder, closely simulating in position and form and symptoms an enlarged prostate, I opened the membranous part of the urethra, and passed a soft instrument into the bladder and kept it there. Want of sleep, and food, and loss of blood, from prolonged cystitis, had already so exhausted the patient that he only lived three days. The operation, nevertheless, gave marked relief. The night before it was done he was up every ten minutes (previous nights had been little better), and expelled a few drops of urine and blood, and was so entirely worn out as to be practically moribund. I need scarcely say that keeping a catheter in the bladder, through an opening in the perinæum, is not at all an unusual proceeding. It is not infrequently adopted in external urethrotomy in the treatment of urinary fistulæ. What is here new is this—in prostatic retention, when an instrument cannot be passed at all, or when it cannot be passed with the needful frequency,

give the finger an opportunity of wriggling itself through the prostatic urethra, and let a soft instrument be conducted along it and left in the bladder and perinæum. In the extremely rare cases in which this could not be done, the then shortest, and most direct, and most convenient route to the bladder is through the roof of the membranous urethra.

Since writing the above I learn that the first step here proposed has been taught and practised by Mr. Gouley of New York. Mr. Teevan has also recently recorded his favourable opinion of the proceeding.

CLINICAL LECTURE ON A METHOD OF PERFORMING LITHOTOMY.

ALTHOUGH the contrivance of the lateral method of cutting for stone was a great step in advance, it cannot be said that there is no room for further improvement. Every detail is a matter of controversy, and some of the details are attended with difficulty. One author has taken the trouble to count the difficulties, and makes them out to be nineteen in number. I must refer you to the text-books for their fuller consideration, and here merely remind you that the mode of holding the knife, the position of the blade in the staff, where the incision should begin and where it should end, and how large it should be, are debated questions. There are dangers to the rectum, to the peritoneum, to vessels, to the genital apparatus. There are difficulties in getting into the bladder, difficulties in getting the stone out of the bladder, and difficulties arising from making a false bladder.

A case of lithotomy, probably unique in its character, came under my notice several years ago, which, after much reflection, suggested the operation which you have seen me adopt in recent cases of stone in the bladder. A gentleman resolved—perhaps not very wisely—to commence a career of operative surgery at middle life. One of his first operations

was a lithotomy in a little boy. I held the staff for him.
He opened the membranous urethra properly enough; but
on making the deep incision, his knife passed (as was
subsequently found) by the side of the staff, instead of along
the groove, through the roof of the urethra into the space
in front of the bladder. On putting his finger into the
wound another error was made: feeling the stone indirectly
through the anterior wall of the bladder, he believed his
finger to be in direct contact with it, and directed the
staff to be taken out. The forceps, carried into the artificial
bladder, of course failed to seize a stone. After much vain
effort he asked me to examine the parts. I found the
condition I have described, and immediately inferred the
steps which had led to it. I need scarcely tell you that
I advised that the lad should be put to bed, and the
operation repeated at some later time. But my friend
urgently desired, for special reasons, that the stone should
be removed there and then. I found that (using the left
hand) by putting my finger into the rectum and my thumb
deeply into the wound, I could seize the stone with the
bladder around it; my thumb was outside the bladder at
the front, and my finger was outside the bladder at the
back. Instantly realising the fact that no important vessel
or nerve, no peritoneum or bowel, was near, I decided to
incise the front of the bladder. I passed a sharp-pointed
curved bistoury by the side of my thumb, and carefully
cut through the bladder-wall, the point of the instrument
quickly coming on to the rough stone. The finger in the
rectum pushed the stone through the opening; but a
forceps was needed to bring it from the front of the
bladder through the perineal wound. The boy's recovery
was rapid and unbroken. I have been asked why I have
not made known this remarkable case before. My friend
was sensitive to criticism. A few months ago he died.
His friends, who were also mine, who were present at the
operation, will not now accuse me of impatience or
unfairness.

This case has frequently led me to review the principles

on which we base our operations on the bladder, and this question has been forced upon me: is not the front of the bladder its safest aspect; is it not the aspect most sedulously avoided. We prefer to open the apex, which touches the peritonæum, or the base which touches the rectum. Let us imagine what may seem at first sight a singular group of circumstances. A surgeon is about to cut for stone for the first time in the history of surgery. The patient is a man whose external genital organs and the triangular ligament itself have been swept away—say by an accident. The finger in the membranous and prostate urethra can draw the neck of the bladder well down towards the sacrum. The stone is large; in order that it may be removed, the bladder must be cut somewhere. The smallest, simplest, and safest incision, will be one that enlarges the natural orifice in one direction or another. Now, is it conceivable that a surgeon unfettered by habit and tradition would think of cutting in any downward direction—of cutting towards the rectum or the delicate genital apparatus, and in a direction where safe space is most limited? But such a man, devoid of external genitals and of triangular ligament, is practically before us every time we operate for lithotomy through the perinæum. Such a man is *not* like a woman, in whom it may be objected that the upward incision is not generally accepted as the best. Quite otherwise. The urethra and prostate gland are deeper in the pelvis, are close upon the rectum, and above all, are not held up firmly to the pubic arch by the triangular ligament.

The proposal, then, which I make is this: the membranous urethra being opened behind the triangular ligament, the deep incision—the incision in the prostate gland and the neck of the bladder—shall be made upwards and to an extent suited to the size of the stone. The extent, I believe, need rarely reach the capsule of the prostate. Where the firm fibrous submucous tissue is divided, and the substance of the prostate scored, the dilatability of the parts is singularly great.

Touching the details: the first incision may be made as in the median or in the lateral method. The latter seems to me to give easier access to the apex of the prostate. I put a little angle in the outer wound, so that the concavity is towards the rectum, and all parts of it are more equally distant from the rectum. The membranous urethra should be freely opened. The well-oiled finger should then be gently carried along the staff through the uncut prostatic urethra, and brought into contact with the stone. The staff having been taken out, the finger firmly depresses the neck of the bladder downwards and backwards, while a straight blunt-ended bistoury is passed flatwise along its dorsum until the bladder is reached. The instrument, having its edge turned upwards, is carried by a quick movement a short distance into the bladder, and with the edge still upwards, withdrawn in contact with the dorsum of the depressed finger. This proceeding gives a fairly uniform diameter to the wound. As a rule, pressure of the knife upwards is not needed; the urethra, being stretched on the finger, is incised to a sufficient degree by a single sawing movement. (See Plate X., Fig. 1.) If the stone be known to be very large, free incision upwards is easily made, and in a direction which readily allows a large stone to be removed. The forceps is next slid along the surface of the still retained and still depressed finger, and the operation is concluded in the usual way, save that all manipulation by finger or instrument is directed downwards to the floor of the neck of the bladder and to the prostatic urethra. The staff in this operation should not be large (especially if the operator's finger be large). A staff large in the membranous urethra, and prolonged probe-like into the bladder, might be partially withdrawn while the finger was insinuated into the bladder; or a probe might be run into the bladder, as in the median operation, prior to the withdrawal of the staff.

A very simple expedient may be adopted where the urethra is small, which is especially useful in children. It is an expedient which some surgeons may prefer in all

cases. A concealed bistoury, larger and stronger than the one used for dividing strictures at the meatus, may be easily carried into the bladder, after the membranous urethra is freely opened, along the staff (or even without the staff) in the urethra. A nervous operator may touch the stone with the instrument; the blade is then directed upwards and projected to a measured extent, and the instrument is withdrawn with the sheath pressing back towards the rectum. It seems to me that no lithotomy could be more simply contrived or formulated than this : open the membranous urethra on a grooved staff; put a strong simple concealed bistoury into the bladder ; project the blade upwards and draw out the bistoury; put the finger into the bladder, feel the stone, and extract as usual. Much may be done with this bistoury. (See Plate X., Fig. 2.) It may be used as a sound; it may incise the prostatic urethra to any desired extent. After the incision (or before, if the urethra be large enough), the sheathed bistoury flatwise is an excellent guide for the finger to the bladder. All these advantages I experienced in the case of this little boy— my fourth case.

Whether the straight bistoury on the finger, or the concealed bistoury, be used, the instrument should be so held that the upward incision is confined to the prostatic urethra. The floor of the membranous urethra is already divided; its roof need not be cut. To confine the upward incision to the neck of the bladder, and to avoid opening the roof of the membranous urethra, and thereby avoid opening unduly the space between the bladder and the pubic bones, is the one great precaution the operation requires.

I have found less than usual hæmorrhage by this method; but, if it be at all free, say in adults, the application of a long sponge-tent for an hour or two effectually checks it. The tent may be withdrawn at will, without removing the tube.

I have been asked if there is no danger of urinary infiltration. Urinary infiltration is not a feature of the supra-pubic operation, in which there is no downward drain,

as there is here. I have had five supra-pubic operations :
three in little girls, one in a boy with traumatic stricture ; all
these recovered. One, a man with fatty viscera and with a
stone that could not be removed through the perinæum,
died. In no case was there urinary infiltration. Here, in
fact, the urine drains away from and under the deep cut,
not over and into it, as in the lateral method. The upward
incision in women, whatever other drawbacks it may have,
is not attended with urinary infiltration.

The advantages of the operation seem to me obvious
and numerous. The floor of the pathway to the bladder is
uninjured, and underneath this floor lie the main dangers.
The route to the bladder is more direct, is less angular, and
its diameter is more uniform. The operation is simple in
principle, more definite in detail, more easily performed.
In the lateral method, the far end of the deep cut is
necessarily an uncertain point. If the knife stop short of
the end of the staff, there is uncertainty ; the position of
the end of the staff itself is a variable one. The floor of
the bladder is practically on a level with its neck, and
therefore the vesical end of the deep incision is inevitably
an unfixed and an unfixable spot. The front of the bladder
on the contrary, is at a sharp angle to the prostatic
urethra, and furnishes a natural, definite, and measurable
limit to the vesical cut—a cut which begins at the angle and
comes forward. The incision may be made larger at will
by definite and clear steps. Where the prostate is enlarged,
it is a great gain not to leave large cut surfaces in its
substance—surfaces which heal slowly or not at all. It is
possible that an upward cicatrix might give unexpected relief
in some cases of prostatic difficulty.

I have told you of my first case of several years ago. The
next case was in a man near sixty, with enlarged prostate,
but spare and temperate. Three years before I had cut him
by the lateral method, and removed a large stone. On the
second occasion, I operated by the method I have described—
treating the neck of the bladder somewhat after the fashion
of the neck of the sac in strangulated hernia, and notching it

upwards on the end of the finger. Three calculi, each averaging an inch and a half in diameter, were removed with great ease. The forceps was gently held along the whole tract, and not more at one spot than at another, a new experience to me. A long sponge-tent remained by the side of a tube for a few hours. His recovery was complete and rapid. The third case, which ended unfavourably, was that of a man aged sixty and extremely fat. He stoutly alleged that he lived a temperate life—falsely as it was afterwards shown. The bladder was the deepest I have met with. Five calculi, all exceeding an inch in diameter, were removed. To my great regret, I found that the too zealous curiosity of some friends who were present had led them to insinuate their fingers upwards between the bladder and the pubes. This reminds me of the one great precaution to be taken : let there be no manipulation or examination in an upward direction. No purpose can be served thereby. After death on the third day, the heart and liver were found to be unusually fat. There was a limited patch of urinary infiltration above the pubes ; it was not near the peritonæum, and there was no peritonitis. Probably it had nothing to do with the result.

My last case was in this little fellow eighteen months old. I opened the membranous urethra on a grooved staff, and then carried, without a hitch, a concealed bistoury into the bladder along the staff, but with no anxiety to keep in the groove. An instrument that passes readily in the direction of the bladder cannot go anywhere except into the bladder. Without caring to do so, I felt the stone with the end of the instrument. Turning the blade upwards and projecting it, I incised the neck of the bladder upwards. Keeping the closed instrument on the floor of the entrance to the bladder, my finger passed over it into the bladder with great facility. The forceps, introduced over the finger, seized and brought away two calculi in close contact with each other, and weighing together 185 grains. I never saw so little hæmorrhage. He passed all his urine by the natural channel on the seventh day. He is now in perfect health.

Since the above was written, I have had two other cases. A boy of five, who left the hospital well in a fortnight. The sixth case was in an extremely feeble and delicate lad, who sank and died from peritonitis. Unfortunately, in this case, I was compelled under peculiar circumstances to operate with very imperfect instruments.

I have spoken in a hopeful manner of the operation above described, and I believe there are circumstances in which it will be, at least, of great service. Nevertheless, still further experience of my own, or of others, is needed before it can be made clear whether the operation is destined to be of general or exceptional utility. In one case above recorded it served me well when no other step was open to me.

NOTES ON VESICAL CALCULUS.

The Treatment of Calculus in the Female Bladder.—A little time ago I was asked by the family attendant to see a lady getting on in years with stone in the bladder. We were not allowed under any circumstances to resort to any cutting operation. I found a stone of extreme size so grasped by the bladder that it was quite impossible, even under full anæsthesia, to apply the blades of a lithotrite to it. Left to my own judgment, I should certainly have performed some kind of lithotomy. I had previously stretched the urethra with my fingers. I now put in a strong pair of lithotomy forceps, and slowly but firmly extracted it. The long diameter of the stone was two and a half inches, the shorter, one and a half. The stone was caught in a fortunate position. She held her water the first time for half an hour, and speedily completely recovered. This case suggested to me the advantages, in ordinary and small calculi in the female, of simply slow extraction without the previous use of dilators or with only such use as will permit the introduction of the finger. The secret of the operation is, with full anæsthesia, to occupy half or three quarters of an hour or even longer in the process of extraction. The stone should be "delivered" patiently, as a first child is through

a previously unstretched vagina, but with more decided traction to overcome less yielding tissues. With the forceps only we secure a minimum of dilatation with a minimum of duration of time. When a cutting operation is required in the female I prefer the supra-pubic. In three little girls I have performed this operation with success. The finger in the adult bladder is an excellent guide to the apex of the bladder.

While correcting these pages another case of still larger calculus in the female bladder has come under my care. I resorted to similar operative steps; the woman is now in hospital and holds her water three or four hours.

On Sounding for Calculus through the Perinæum with a Long Needle in Traumatic Stricture.—Nine years ago I adopted a novel method of sounding for stone in the bladder in a little boy with severe traumatic stricture, which may under similar circumstances prove of use to others. No instrument could be passed into the bladder, and a urinary fistula existed on one side of the perinæum. There was every reason to believe that a stone was present, but before operating I introduced a long acupressure needle an inch in front of the anus, and carried it behind the pubes. It came into contact with a calculus, and on being withdrawn a little and then urged quickly onwards a distinct click was heard by all who were round the table. I removed the stone by the supra-pubic method, and the lad made a good recovery. After the removal of the stone I carried my finger to the vesical meatus, and readily passed a bougie to the traumatic stricture, but unfortunately not through it. (See Plate X., Fig. 3.)

I believe this was the first attempt to pass an instrument through a stricture from behind forwards by means of a supra-pubic operation—an attempt being made to kill two birds with one stone. John Hunter proposed (and proposed only) to reach the rear of a stricture through the apex of the bladder with a metal instrument to be met by another metal instrument in front.

PART V.

ENQUIRIES IN THE SURGERY OF THE LIMBS.

ON A COLLAR ABOVE THE ANCLE IN WOMEN.

In 1861 I described very briefly, and in 1862 more fully, a condition of the leg in which there exists a ring-like enlargement, or collar, surrounding the lower fourth or third of the leg, and which is found in young women only. Shortly after this Professor Vanzetti, of Padua, noticed with interest a similar condition, and while engaged in its observation he received the number of the *Medical Times and Gazette* which contained my fuller account and diagram of the collar. In an article in a leading Italian medical serial he reproduced my views and diagram in conjunction with the reports and photographs of his cases and courteously sent me copies of them. Mr. C. Williams, of Norwich, also sent me reports of cases with remarks which proved of great value to me. The late Dr. Tilbury Fox also referred to my description of the ancle collar in his writings on skin diseases, and although I am unable to agree with his classification in reference to . it, his name is cited here to show that the ailment under discussion is a real one, and justifies me in again drawing attention to it.

A typical case (see Plate IX., Fig. 8) will give a bird's-eye view of the disease, and will at the same time serve as a text for further comments. The patient is a young woman, between fifteen and five and twenty; she has moderately good health, but not a strong circulation; the catamenia are persistently deficient and irregular. A swelling slowly and painlessly forms around the leg (one, or more, commonly both), just above the ancles; it extends from the

ancles upwards for a fourth or more of the leg; the collar-like swelling is convex, from above downwards, being more prominent in the centre, and merging neither very suddenly nor very gradually into the leg, above and below; it is not painful, or tender, or red, or obviously œdematous; the skin seems natural, but cannot be glided over the swelling; the swelling is moderately firm, and elastic, and immovable. The depth of the swelling at the centre is about an inch—frequently less, sometimes a little more. It is little amenable to treatment, but it probably, after some years, slowly diminishes in size.

The disease, although uncommon, cannot be extremely rare, seeing that I, and Mr. Williams, and Professor Vanzetti, have seen above a dozen cases. The essential facts are that the patient is a young woman of rather feeble circulation, and clearly deranged catamenia; but the patient is also single; if it be present in the married state it has probably come on before marriage. There is no organic disease of the heart as a rule; one of my cases, however, had mitral disease, and it is very conceivable that cardiac mischief might favour the development of the ancle collar. Œdema of the leg is not usually seen, but it was present in one of Mr. Williams' cases; it was not present in my cases, or in Vanzetti's. Of the relation of the pathology of the swelling to œdema I shall speak shortly. The lower margin is not limited by the pressure of an ordinary boot, as simple œdema frequently is, because cases have been observed, here and in Italy, where boots half-way up the leg have been worn. There are no varicose veins of the leg; and women with varicose veins are not liable to ancle collar.

That it gradually diminishes in size (it probably does not altogether disappear) may be gathered from the circumstance that it is not seen in any marked degree in women of middle or later age.

Treatment has little effect on it—at least treatment by strapping and ordinary pressure. Should any case come under my notice in future I should try Martin's bandage, the

patient use of which I think would be certainly beneficial.

A consideration of the nature or pathology of the ancle collar I have left till last. Let us first see what it is not.

It is not elephantiasis arabum. In elephantiasis the skin is greatly thickened, hard, rough, nodulated, of dark colour, and lessened sensibility. The bones, connective tissue, fat, and all other structures (the muscles excepted) share in the enlargement. The feet and toes are also implicated.

It is not any form of innocent tumour or outgrowth. It has no capsule; it is adherent to the skin at the surface and to the deep fascia at its under aspect. The age and locality are inconsistent with the appearance of either connective tissue tumour, or connective tissue outgrowth—the latter mostly springing from the vicinity of the pelvic outlet, and having thickened skin over it.

There is no need to discuss the question of hypertrophy in the ordinary acceptation of the term; none of its conditions are present. Erythema nodosum sometimes leave bulky masses on the leg, but it has a characteristic history, and the enlargements which it leaves have no uniformity of configuration or locality. The antecedents of the collar leave no room for supposing that it is any degree or form of phlegmasia alba dolens.

I do not think it is any form of skin disease, although so eminent an authority as Vanzetti uses the word pachydermatous in relation to it. Dr. Tilbury Fox, who also regards it as primarily a skin disease, applies the term dermatolysis to an affection in which the skin hangs in loose folds, its fibro-cellular element being greatly increased, and is disposed to put the ancle collar in this category. I am quite unable to accede to such a view. In the collar there is at no time any tendency to the formation of loose folds, or indeed to any such softness or pliancy as is essential to the formation of a fold. Moreover, I again contend that the skin is not thickened, and is only *secondarily* affected; its elements are not larger or coarser. It is true it cannot be lifted up or glided over the enlargement, because it is adherent to it in the same

way (probably by a similar process) that the skin is frequently glued down to subcutaneous inflammatory indurations or suppurating cavities. In other pages of these enquiries, cases are recorded of the formation of huge folds of the cutaneous structures, but in them (and I believe in many similar cases) a nævoid element seems to me to have been the starting point.

The collar, I believe, consists of greatly thickened subcutaneous connective tissue. Its origin is in some way probably due to a very slight and very chronic œdema; the continual presence of a small quantity of serum acts as a continuous irritant, and leads to the formation of new tissue by means of a chronic and almost symptomless inflammation. The formation of new tissue *in and around* the old loose tissue gives firmness to all the tissue of the involved area.

But why should the new mass take the form of a ring-like collar surrounding the lower third of the leg? The explanation I believe to be this: in the lower third of the leg the soft, loose, subcutaneous fascia is not compressed by muscular action; because in the lower third of the leg (and here only) there are, as a rule, only bones, and tendons, and loose connective tissue—no expanding tissues. The action of muscular pressure in preventing and modifying pathological action is not sufficiently appreciated, and it is too large a subject to discuss here. Ischio-rectal and axillary abscesses are, in some measure, due to freedom from pressure. The lungs and certain other structures would not so frequently be the seats of tubercle if they were subject to active muscular pressure. The tendons of the deeper layer of muscles have, it is true, muscular fibres joining them at a lower level, but they are held tightly down by the deep strong fascia which is attached to the tibia and fibula. In exceptional cases the soleus muscle sends muscular fibres to the under aspect of the tendo achillis almost to its insertion; such cases we may reasonably infer would be little liable to the formation of a collar, or indeed to the presence of a

PLATE X.

Figs. 1 and 2 show a method of operating for lithotomy.

Fig. 3. Diagram of case where sounding for stone was effected by a long needle.

Figs. 4 and 5 (from photographs) large congenital fatty tumour of foot.

Figs. 6 and 7 show a method of amputating at the hip-joint.

PLATE X.
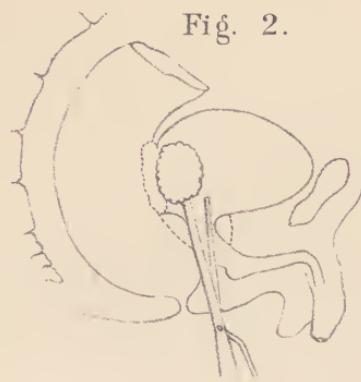
Fig. 2.
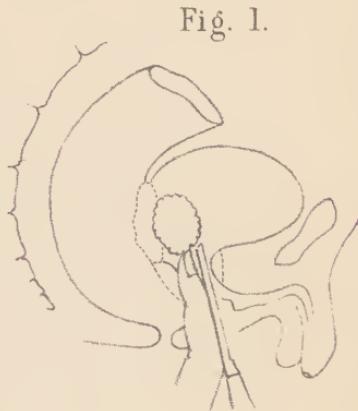
Fig. 1.
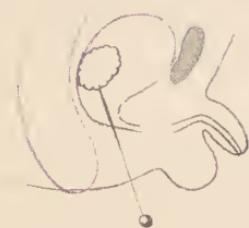
Fig. 7.

Fig. 6.

Fig. 3.
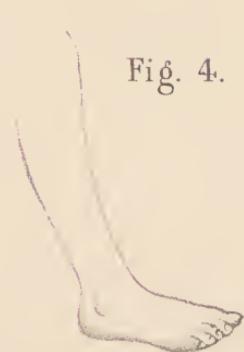
Fig. 4.
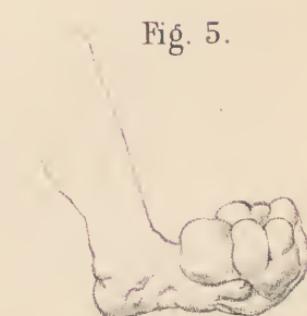
Fig. 5.

languid venous circulation, with its attendant eczema and eczematous or, so-called, varicose ulcer.

CLINICAL NOTES ON DISEASES OF THE BONES AND JOINTS.

A case of apparent absence of the Femur.—I was asked by the medical adviser of the family to see a baby of a few weeks old, with apparent absence of the right thigh. The knee seemed to be slung from the hip, and to be on a level with the perinæum. There was then very limited movement in the part. On making a very careful examination, with the assistance of a little chloroform, I came to the conclusion that the femur was present, but that it was broken into rather small fragments, and these were drawn up by muscular action and constant intra-uterine movements into an irregular spherical mass. The fragments seemed to be in the soft parts which served the purpose of a sort of pudding bag, and were seated between the acetabulum and the head of the tibia, which was two or three inches distant. It is unnecessary to say that no treatment was suggested until the baby was active and strong enough for some mechanism, which might make standing and walking possible.

Suppurative Periostitis without Necrosis.—Probably this happens more frequently than is suspected, because it is not unlikely that many deeply-seated collections of matter are due to more or less transient and unsuspected periostitis. In an abscess over the ilium in a girl of seventeen, I felt bare bone when the abscess was opened, but the abscess quickly closed, and the opening healed and remained so. It may fairly be concluded that no bone permanently lost its life. In a girl with a sinus of several months duration, over the lower and inner end of the shaft of the femur, I found on exploration apparently dead bone. I was able to get a glimpse of bare bone, which was of a brown colour. I predicted the need of operation at a not remote date.

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The friends firmly declined any interference, and after some months more, the sinuses entirely healed, and now for several years the limb has been perfectly well.

The Transitoriness of Osteal and Periosteal Inflammations is probably not sufficiently recognised. In some previous observations on deep abscesses, caused by short-lived periostitis, I have anticipated this note as regards the periosteum. But we meet with cases in which there is some deep pain and tenderness on firm pressure, and probably some impaired movement in the adjacent joints. These symptoms only last a few weeks or months. To my mind there are cases of more or less transient ostitis. I have known the head of the radius slightly enlarged, and distinctly tender, and the movements of pronation and suppuration painful and incomplete, and yet the symptoms continued a very short time. There had been no injury or sprain; there was no synovitis; ligaments are well known not to be seats of primary inflammation. I give this as a suggestive note merely, but the slight example I have cited serves as an illustration of some experience in other parts of the osteal and articular frame work.

The Inexpediency of Interfering with Long Retained Sequestra in some cases.

It may seem a ventursome and heretical policy to suggest the expediency of permitting dead structures to remain in the living body. To make a rule of doing so would certainly be indefensible on many grounds. But there are some cases where, against skilled advice probably, portions of dead bone are retained for several years, and then the patient, or the patient's friends change their minds, and ask for operative relief. In some cases I doubt the propriety of acceding to the request. My doubts are based on two kinds of experience—the experience of removing long retained sequestra, and the experience of leaving them alone.

I will briefly relate some of the cases which have led me to the conclusions I here suggestively put forward. An

Irish labourer, when sixteen years of age, had acute periostitis of the right tibia, involving the greater portion, if not the whole of the shaft, but leaving the epiphyses. No operation was performed, and he gradually got about, turned to work, and carried the dead bone in his limb *for thirty* years. He came to hospital and was very desirous to have an operation performed. This happened some years ago, and I had not then formulated any conclusions of my own, but accepted the current teaching. There were several sinuses over the dead diaphyses, and some ill-smelling but not abundant pus escaped from them. I operated. There was a dense thick irregular case of encasing, but not now new, bone. The dead bone was ·in fragments and shreds, and of brownish yellow colour. The interior of the (new?) case was a tangled patch-work of new and old bone. I removed all I could and determined to err on the side of removing too much rather than too little. A long, apparently clean trough remained. His convalescence was very slow, fitful, and unsatisfactory. Suppuration was abundant and unhealthy. Febrile attacks with high temperature occurred from time to time. After a wearisome time in the hospital he went out with the wound much smaller, but far from healed. He attended some time as an out-patient but made little progress, and was in reality a helpless invalid. Eventually he ceased to attend, and I lost sight of him. I came to see that we had done no good, and I decided that if any at all similar case came before me in future, I would recommend patience, cleanliness, with antiseptics, and such rest as could be obtained, but *no operative interference*, or at least no interference except amputation. Amputation here was distinctly rejected, and, indeed, to advise amputation in a person of active habits and occupation is a proceeding of no little responsibility. Each individual case must be judged on its own merits.

It is in very old-standing necrosis of the femur that it is most important to weigh well the propriety of surgical proceedings. If the disease be of several years' standing, and the local and general symptoms quiet, life and comfort

are both probably best secured by non-interference. I am frequently content if one sinus be rather freely discharging to enlarge it under an anæsthetic, and examine with the finger. If an accessible and loose bit of bone is found (an infrequent circumstance) I should remove it. I saw a lady, with her family adviser, with very old sinuses (15 years) in the thigh. She had suddenly become desirous to have something done. I advised exploration of the most trouble-some sinus. Nothing capable of relief was found. The whole femur was the seat of extreme enlargement. This happened three years ago, and she is going on with fair comfort. The trouble of changing dressings is her chief complaint.

The family physician of a lady approaching middle age, who had always been very delicate, consulted me as to what should be done for sinuses of many years' standing in the thigh. She was much depressed at the idea of operation, and was suffering no marked inconvenience from them. I said "leave her alone; let her carry her bit of dead bone in its large, and no longer new, case to the end of her days. Her life may be long, or it may not, but her chances are altogether better without operation."

It is well known that the lower end of the shaft of the femur on its popliteal aspect is prone to be affected with periostitis and consequent necrosis. This is often neglected for years, and the bit or bits of bone are entangled in thick masses of new bone. In the close vicinity are the knee-joint and the popliteal artery. In such cases, as well as in the more diffused necrosis, I advise scrupulous cleanliness, much rest, light restraining apparatus, and, perhaps, the aid of crutches. In some cases a few days' rest in bed, occasionally, will almost close the sinuses. Several persons to my knowledge are taking this advice with good results and with happier minds, that the evil day is indefinitely postponed, and perhaps will not come at all.

I make a point of saying "if the part gets much worse, and you get, and keep, ill in yourself, surgical measures may be needed." Let me once again say I am speaking of old,

as a rule very old, necrosis only. The risk that is run is, of course, lardaceous disease. In the young this risk should be unquestionably avoided, or at any rate clearly pointed out. In my experience, lardaceous disease, from prolonged slight suppuration, is extremely rare in middle and late life.

ANOMALOUS HIP DISEASE IN YOUNG WOMEN.

TEXT books of surgery, and indeed the literature of surgery generally, contain little information about a class of cases of a curious character, but which, though not common, are perhaps not extremely rare. In these latter days of pulley and splintage they are probably disappearing.

A young woman (I have seen three or four cases—all young women) with irregular symptoms of hip disease, takes to her bed. The limb does not always take a typical position, but it is usually flexed, the knee is bent too, the other lower limb is flexed so as in bed to adapt itself to the affected limb. Gradually every joint in both limbs becomes rigidly fixed and painful. All movements are extremely painful. Some parts of the limbs waste, some become œdematous. It soon becomes difficult to say which joint is affected, or whether more joints than one are involved. After many months or even years of helplessness and confinement to bed, some improvement sets in. Some of the joints are moved a little. With much persuasion and assistance, a few steps are taken with crutches. The improvement goes on slowly, but in time it probably goes on to a considerable degree. I say probably, because I have not been fortunate enough to be able to follow any of these cases to the end of their long and wearisome course.

In these cases of obstinately flexed, rigid, and painful joints, I have not met with any in which suppuration occurred. In one case œdema at the upper and outer part of the thigh was so marked that I suspected deep suppuration, and made a deep exploratory incision, but with no result for good or evil.

It is an important and legitimate question how far hysteria exists in these cases. It is difficult to say, but that it is present and materially modifies progress is probable. Such "huddling up" of the lower limbs, with acquired rigidity, is not seen in youths or men. Then again, the pain and tenderness are greatly in excess of all the organic changes which can be recognised. If the hysteria could be detected in the early stages in any case, its management would be an easier task. All the cases I saw were old and confirmed when I first examined them. I suspect, in such cases, "the doctor" is not called in until much mischief is done. In some of these cases the fever of acute joint mischief is mistaken for typhoid or rheumatic fever, and the huddling is not correctly interpreted until much mischief is done.

There is another class of cases in which, with little or no hysteria, the symptoms are unusual. They also occur in young women. The patient stands or walks with pain, and therefore keeps in bed, but there is no "huddling up" or much pain even on examination. In the case which I best remember the limb was extended and somewhat everted, but there was neither abduction nor adduction. There was pain on moving the joint, and movements were very limited. After a very prolonged invaliding with occasional but unsuccessful efforts to get about, a large abscess was opened at the upper and outer aspect of the thigh. With no new or special symptoms, and after two three years ailing, she sank exhausted. Her death happened without my knowledge, and no *post-mortem* examination was made. I infer there was in this case, and probably is in allied cases, some periostitis or osteitis, possibly some necrosis or caries, in the pelvis and in the vicinity of the acetabulum. Such inflammatory action may exist at one spot only, at the margin of the articular cup, or possibly surround it more or less, or it may involve the joint, much or little, or early or late. Such manifold expression of pathological action will produce manifold variety in symptoms.

The Scarification of Intra-articular Loose Cartilages.

FIVE years ago I saw, with his family adviser, a gentleman who had suffered on three different occasions within eighteen months, from synovitis in consequence of a loose cartilage having got between the articular surfaces of the right knee. I proceeded to remove it under Listerian precautions. It was small, not easily found, and when found it presented at the lower and outer side of the patella. I cut down upon and in dividing some firmish fibrous tissue over it to a sufficient extent to permit its extraction, it suddenly slipped from beneath our fingers. I had freely scarified its surface in two or three longitudinal lines in cutting through some extremely tough coverings before it slipped away. A moist, antiseptic sponge was fastened over the wound before the spray was removed, and he was directed to walk about (he had no anæsthetic) with the object of again bringing the loose body within reach. Our efforts were fruitless. The wound was antiseptically dressed, and as the wound was small and there was no hæmorrhage, the dressing was retained several days. The wound was found perfectly healed. His knee was kept immovable and he himself also for a fortnight. The movements of the knee were restrained for some months. He has been perfectly well since. No doubt the cartilage slipped into a remote and quiet corner, and there formed firm adhesions. In such a recess those adhesions are not likely to be torn through.

Fully granting the safety of opening the knee joint under Listerism, it is nevertheless still an excellent rule in surgery to accomplish results with a minimum of operative effort. Probably most surgeons would prefer, in their own cases, if the prospect of success were fair, to have a tenotome so used that a loose cartilage might be freely scarified by a subcutaneous method and with the least possible cutting of the coverings of the knee, followed by a short period of entire rest, and subsequently by a longer period of restrained movement. If so simple and entirely safe a proceeding should fail, as I think it unlikely, it in no way interferes with more radical steps at a later time.

A Case of Excision of the Os Calcis and the Astragalus
in which the Second Row of Tarsal Bones was drawn
underneath the Malleoli. (From the Clinical Society's
Transactions.)

A girl, Maria G., æt. 14, came under my care at the
Queen's Hospital, with, apparently, caries of the os calcis.
She was sent to me by the authorities of the Middlemore
Refuge—an institution which takes children from the gutter,
and feeds, clothes, and educates them for service in Canada.
She had been taken from the streets with the ready consent
of drunken relatives. When, however, it was found, shortly
after admission, that there was disease of the bones of the
foot, a difficulty arose: it seemed inhuman to send her
back to careless relatives, who were glad to be rid of
her; and yet if she lost her foot she could not well be
trained for emigrant service.

As the disease seemed limited to the os calcis, I gouged
out, as I believed, all the carious bone. But the sinuses
did not heal. A second more extensive gouging was followed
by no better result. Indeed, I feared, as other surgeons
have feared before, that each gouging gave rise to further
osteitis and further caries. Each operation was followed by
careful and prolonged rest, immobility, and elevation.

As the direction of the carious area seemed to extend
upwards, and new sinuses also pointed to the implication of
the astragalus, I determined to excise both the os calcis and
the astragalus. In the earlier gouging operations I made
the incisions in the sole over the heel in its long axis, and
parallel with the outer border of the tendo Achillis. When
it seemed desirable to exise the two bones I wished to
avoid making another deep cicatrix, and therefore I took
the line of the old incision, extending it upwards at each
end, so as to make a somewhat semilunar flap, the convexity
of which looked downwards. This flap was at the outer
aspect of the heel, and, when lifted up, gave ready access
to the diseased bones. The joints having been opened, first
in front and then above, the bones were removed.

The after-treatment required considerable care to keep the foot in the exact axis of the leg. After a little experience it was found that slinging up the anterior part of the foot—in other words, holding the leg up by means of the toes—secured the best position. In all other respects the progress of the case was most satisfactory. The shock and reaction were of no moment, and the healing went on solidly and certainly, so that in eight or ten weeks, the wound and the sinuses had healed, and the foot could be moved and handled without pain.

But now a curious circumstance attracted notice. It was found that the foot had not only become gradually shorter but that the first row of tarsal bones having been removed, the second row had in some degree taken their place. The scaphoid and cuboid bones were partly under the malleoli. The tibia and fibula were thus kept at some distance from the ground, when the foot was put down. How was this brought about ? Probably by the action of the muscles which lie at the front and sides of the ankle. In such action the tendo Achillis could, of course, take no share. The incident was unlooked for, seeing that before the operation the scaphoid was held at some distance from the tibia by its articulations, and that during repair, the foot was suspended by its toes. (See Plate IX, Figs. 9 and 10.)

I feared that the remaining portion of the foot, when the weight of the body came to bear on it, would ride or turn upwards, and thus give rise to inconvenience and unsightliness. That fear has not been realized. It is now nearly twelve months since the operation was performed, and the foot cannot be displaced, either by the weight of the body or by the surgeon's hand. Some retentive apparatus is still worn for the purpose of walking.

The affected foot is one inch and a half shorter than the left foot, as measured from the tip of the inner malleolus to the tip of the great toe, this distance being seven inches in the sound foot, and five and a half in the affected foot. The leg on the operated side is one inch and a quarter shorter ; the measurement being, from the lower border of

the patella to the centre of the heel, fourteen inches on one side, and fifteen and a quarter on the other.

In concluding I wish to ask two questions. Assuming that it is desirable to bring the scaphoid and the cuboid under the malleoli, in excision of the os calcis and the astragalus, can any special operation, or dressing, or position facilitate such a result ? The next question is perhaps less important. Why should we fear to make incisions in the sole of the foot ? I have repeatedly made free incisions into the plantar surface in operating for caries of the os calcis ; the resulting cicatrices have always contracted so as to form deep fissures, and in no case has the weight of the body given rise to later inconvenience. In the cast which is before the Society the deeply indented scar is very marked, and, curiously, seems to be at the outer border of the sole, notwithstanding that it was really made in it.

ON LONG-THREATENING SENILE GANGRENE.

It is a truism to say that old age is relative ; but one man at fifty is as old as another at sixty. It is consequently sometimes difficult to say when any given man is old. But a man of intemperate habits, a fat man, a man of weak circulation, or a very lean and shrivelled man, or a man with signs of atheromatous change, may be called old, whatever the number of his years may be.

A man, or a woman less frequently, with signs of age cannot have an ailment of the foot, especially of an inflammatory character, which if at all persistent is not serious. The ailments may be slight, and they may be of very long duration—one or more years say, but they are of serious omen. After a time unmistakable senile gangrene is likely to set in. Sometimes in the old, an eruption ; sometimes apparently an obstinate chilblain ; sometimes a persistent ulcer of perplexing diagnostic characters ; sometimes an abscess which refuses to heal, or which heals and reforms more than once ; sometimes a sinus as of bone disease ;

sometimes a loosened or detached nail gives trouble for a long time ; but any of these conditions may eventually usher in gangrene.

A publican, intemperate, and infected with syphilis, came to me occasionally from the country with a few scabs on his foot. They were apparently ecthymatous in character. No treatment had any effect on them. One on the metatarsal joint of the great toe was the most obstinate, and it was surrounded by a shining red zone. I told his wife my fears. After seeing him occasionally for a period of longer than two years, I was called to confer with his family adviser respecting a sudden and extensive gangrene of the foot, which took him off in a few days.

A lady of sixty, but who appeared to be eighty, a free eater and drinker, had pain in her toe—the nail became loose and fell off. Over the matrix of the nail were one or two clean, small, inconspicuous ulcers, but they were extremely painful, and were not relieved by elevation. The loosening of the nail and the small ulcers extended over a long period, but eventually they proved fatal.

A stout woman about sixty, a free liver, had an abscess over the inner side of the os calcis. This opened, but the opening persisted many months, and an experienced hospital surgeon very naturally suspected the presence of bone disease. I saw it later and pressed out *a small slough* (which apparently kept up the suppuration) after which the opening slowly closed. Soon after, however, and after an invaliding of between two and three years, senile gangrene seized the heel and inside of the foot, and she soon sank.

A man old, but not in years, had an abscess between the second and third toes, a little slough as well as matter escaped, and when I saw him with his family physician, there appeared a small opening only between the two toes, but a small piece of tendon adhered to one side of the opening. After a prolonged invaliding, unmistakeable gangrene brought a fatal end.

Abscess, and sloughs, and ulcers, and eruptions, in the lower limbs of the old are, then, especially dangerous. They

may excite no suspicion even for a long time, but gangrene follows. Abscesses and sloughs, and combinations of the two are the most dangerous, and they destroy life after the fashion of senile gangrene, even if the gangrene—at least the blackness and fœtor of gangrene—does not actually appear.

CLINICAL NOTE ON A CASE OF EMBOLISM OF THE FEMORAL VEIN INDIRECTLY DUE TO LICE.

THIS case is one of a singular character. A man of dirty habits was admitted into hospital with œdema of the whole of the right lower limb. The femoral vein was converted into a firm cylinder several inches long. The surface of the limb was covered with scratches, a great number of which were highly inflamed. Careful inspection disclosed the fact that body lice were present in great numbers. There can be little doubt that the peristent scratching gave rise to inflammation, and that the scratching being still continued, the minute coagula of the veins of the inflamed districts were dislodged, and conveyed fortunately no further than to the femoral vein, or possibly the external iliac veins. The danger of embolism, from dislodged coagula, in inflammation, is a strong argument in favour of rest. The following case, which came under my notice, is probably not rare:—A man with erysipelas of a lower limb was taken some miles in a vehicle to a parochial infirmary. In less than twenty-four hours he died with the pulmonary artery filled with coagula.

A CASE OF LARGE CONGENITAL FATTY TUMOUR OF THE TOES AND FOOT.

ABOUT three years ago I had occasion to remove a large fatty tumour from the foot of a hospital patient—a young, intelligent, and pretty woman of about eighteen. The case was peculiar and I have not seen or heard of one like it.

The tumour was congenital and had grown only at the rate of the growth of its owner. It rested on the anterior two thirds of the left foot, and forcibly suggested the idea of a foot-ball poised on the foot at the moment of kicking. The foot-ball was living however and attached to the foot. The tumour was irregularly spherical and deeply lobulated, but the lobulation did not *seem* deep because the lobes were flattened against each other. The growth entirely enveloped and disguised the four outer toes, but a certain rough proportion existed between the toes and the lobulated mass. No portion of any toes was visible except the great toe, which was thrust inwards and partially surrounded by the fatty mass. The figure in the plate is an exact copy of the photograph, and the sound leg and foot are also exactly given from a photograph, so that the dimensions are easily seen and calculated. In the lower part of the leg and about the ankle of the affected foot were some smaller, flattish, and also irregular masses of fat, which gave an irregular and unsightly appearance. It will be seen that the length of the tumour was nearly that of the sound foot, and the depth rather more than two-thirds of the length (see Plate X, Figs. 4 and 5).

No attempt was ever made to have a leather covering of any kind. She had from birth moved about rather freely even out of doors, the only protection of the foot being several layers of thick bed-ticking; that this should often be very wet and dirty was looked upon as a matter of course, and the only complaint was that in winter the snow melted and got between the lobes and gave rise to slightly inflamed and excoriated patches—chilblains in short. She contrived to kick her long skirt before her, and her walk was attended with the slightest possible limp.

In removing the mass (the flat, smaller ones about the ankle were left untouched at her own reasonable request) I made no attempt to save the toes, an effort that, it was subsequently seen, would have been entirely fruitless. An upper and a lower semi-circular flap were made, and all the parts in front of the metatarsal bones were removed.

The upper flap was very thin and I feared some of it might slough, but although union and repair were not rapid they were altogether favourable, and a foot was left on which a decent boot could be worn and with which a perfect walk could be made.

The tumour was found to be an ordinary fatty tumour, the fat being perhaps a little whiter and dryer than is usually seen in similar tumours as a rule. The cutaneous coverings were thin, and the fibrous investments were thin, white, and dry. Nowhere was there any of the yellow udder-like fat which is occasionally met with in abnormal fœtal enlargements.

A METHOD OF AMPUTATING AT THE HIP-JOINT.

(ABSTRACT OF CLINICAL LECTURE.)

This youth of sixteen years has had acute and extensive periostitis of the left femur. Several attempts have been made at various times to remove the dead bone, but the results have not been satisfactory. A few sinuses refused to close, the limb remained useless, the hip-joint was involved (the thigh was quite immovable, and no tendons could be made tense under anæsthesia), and the general health was reduced to the lowest ebb. It was clear that the patient if left to himself had not long to live. After much consideration it was deemed desirable to amputate at the hip-joint, and to use every precaution against shock and hæmorrhage. But while amputation at the hip seemed unavoidable the incisions were so planned that they permitted any one of three courses to be taken; exploration and removal of offending bone, or resection of the hip, or amputation of the hip. It is no little advantage of the operation I am about to describe to you that it allows with equal facility any one of these steps to be taken. In this case it was soon seen that amputation at the hip was the only justifiable measure. A tourniquet was put over the external iliac artery, the limb having been exsanguined as completely as

possible by Esmarch's elastic bandage and by position. A straight incision was made, and the trochanters and upper part of the shaft were freed from their muscular attachments, after which the capsule was opened, and some early, but unmistakable, bony union was broken through. Next the shaft was cleared downwards from all its attachments (which are here mostly loose and cellular) for a considerable distance, and then a few free sawing movements, with a long-bladed knife, through the thigh from which the bone had been removed, ended the operation. The integuments were simply drawn upwards, and the soft parts were cut straight through. No bone being left, the muscles quickly retracted, and were easily covered by the skin. Very little blood was lost. The larger trunks were tied with catgut. It was so important to save every drop of blood, that some oozing between the acetabulum and the gluteal region was instantly checked by putting a sponge, soaked in terebene, on the parts, and leaving it within the wound. Adjustment was effected by deep silver sutures. The stump was then dressed by two very large sponges (subsequently kept moist with terebene and water), firmly and evenly held in place by broad long strips of plaster, one strip being so carried over the opposite shoulder that the two ends overlapped the stump. The improvement was so sudden and marked that the next day he said he was "very well." There had been neither shock nor hæmorrhage. The "interior" sponge was left for three days. When the dressing was undone the whole stump had united, even over the sponge, the united parts requiring to be partially broken through for its removal. The later steps of progress were as favourable as the earlier.

The principle of the operation which I have done now, and on previous occasions, may be thus described:—First enucleate the bone, then cut through the limb at any desired spot—the middle of the thigh, or below, or even near the knee. Compared with the ordinary operation of two large flaps (see Plate X, Fig. 6), the wound is less severe, the cut surfaces are less extensive, and, in a manner,

further removed from the trunk. The operation was followed by less shock, less hæmorrhage, less opportunity for septic infection. The vessels were more easily dealt with. The thigh may be simply cut through with a circular sweep or a few free sawing movements. The boneless thigh should be firmly held, and somewhat flattened if cut across. The muscles may be cut on the same level as the skin, after this has been drawn upwards by an assistant's hands ; the bone being absent, they retract so strongly that the skin readily covers them, its vitality is less endangered, and a great cellular plane is not opened. A glance at the diagrams will show that the bulk of the soft parts of the thigh, especially near the pelvis, lies at the inner side of the femur. Why put a knife through these parts ? *It is better to enucleate the femur where it is most thinly covered, and cut across the limb where it is smaller and further removed from the trunk* (see Plate X, Figs. 6 and 7). In removing the thigh *very low down*, the area of the wound is no doubt increased, but even then it would be a much less dangerous wound in character and locality. The operation is of course more suitable for those cases in which the soft parts could be freely left than for malignant and other exceptional cases. The surgeon may, if he choose, make the circular sweep before the shaft of the bone is turned out, if precautions against hæmorrhage have been very complete. There ought to be no hurry; the patient is in a deep sleep, no large vessels are near, and the femur may be patiently turned out of a bed that need neither be scored nor stabbed. I say patiently, but the whole operation carefully and leisurely done need not occupy more than a very few minutes. If the thigh were to remain a soft, pendulous mass, it would be a small price to pay for greater safety, but it is a remarkable circumstance that, as a rule, the muscles do not rest until the longest thigh has become a short one. In hip-disease, with much acetabular mischief, the wound gives safe access and free drainage for any length of time. The principle of the operation might be adopted in amputation below the trochanters (a chain-saw being used), and

indeed in amputations in other localities. The cut surfaces being moistened with terebene, the large sponges were kept constantly moist with the same antiseptic liquid. These kept up deep adjustment, gentle elastic pressure, cleanliness, antisepticity, and rest. When the sponges were removed the stump was as clean as a newly-washed face. It seems a paradox, perhaps, but the moist antiseptic sponge is constantly washing and cleaning, at the same time that it is constantly maintaining perfect rest and immobility. The second figure suggests the principle of the operation—not the immediately ensuing retracted state.

Since giving the above lecture (the case was published in the *Lancet*, vol. 1, page 405) I have had several other cases, and many other surgeons have performed the operation—some have publicly recorded their cases and their opinion ; others have written to me privately. The Nottingham hospitals have had a large experience in the method, and my friend and colleague, Mr. West, has published a case. It is not more than true to say not only that the general verdict is in its favour, but that already it is more frequently performed than the older operation.

I may add that further experience leads me to modify slightly one detail—it is of not very great importance—but I take more decided steps in retracting the skin (with the knife) before the muscles are divided—and this, whether the bone be enucleated first, or the circular sweep be made before the lower part of the shaft is bared, or, at any rate, is removed from its bed. I conclude by again repeating the principle of the operation : enucleate the bone where it is most thinly covered ; cut across the soft parts where they are smallest ; do not touch the bulky soft parts at the inner and upper parts of the thigh.

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